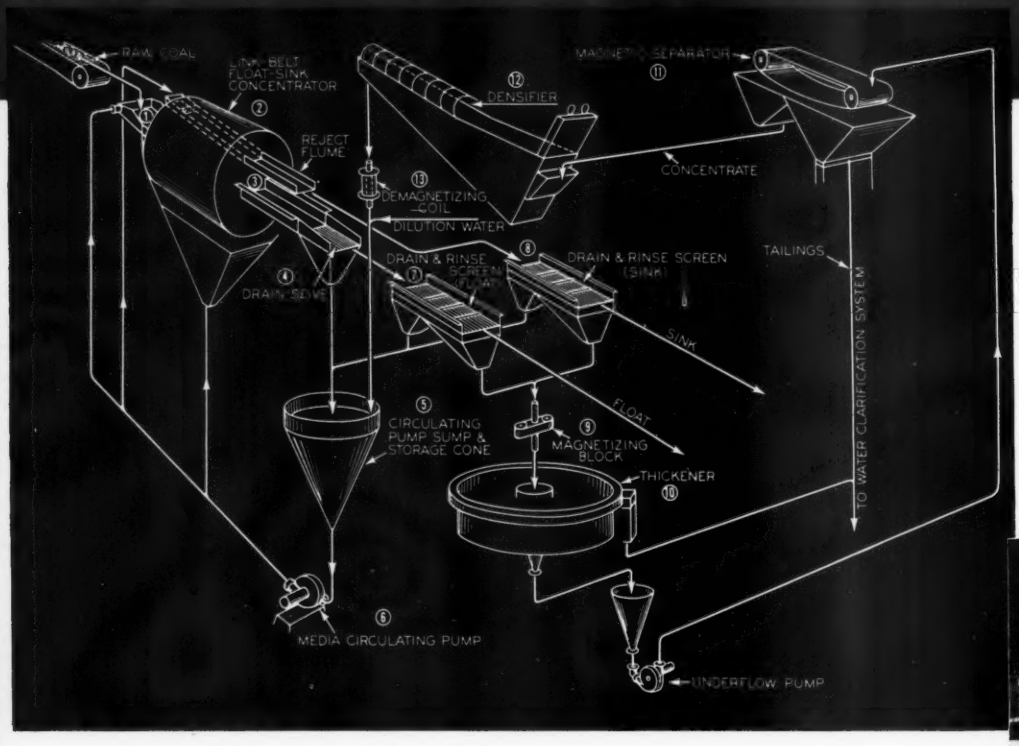
Mining

CONGRESS JOURNAL

THE AMERICAN MINING CONGRESS

MAY
1948

The New
LINK-BELT Float-Sink Concentrator



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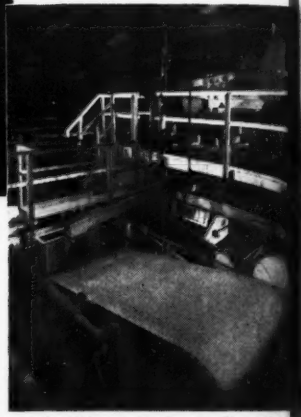

Illustrations above and below show parts of a Link-Belt Float-Sink, Heavy-Media installation at a large coal mining operation in Pennsylvania

Heavy-Media* Method of Cleaning Coal . .

With the Heavy-Media cleaning method, based on the separating ability of a medium composed of water and finely ground magnetite, the American mining industry takes another step forward in improving methods and reducing costs.

The Heavy-Media method has a high efficiency, particularly when a large percentage of the coal handled is near the separation gravity. It is specially adapted to services where the separation must be made at a low specific gravity, also to cases where the amount of impurities in the coal-feed fluctuates widely. It maintains its efficiency throughout such fluctuations without adjustment. It will also handle the larger sizes of coal above the usual 6" range. Easily adaptable to meet changing characteristics of the coal to be cleaned.

The flow sheet above shows the paths of the coal and the heavy-media in the Link-Belt cleaning system featuring the Link-Belt Float-Sink Concentrator and auxiliary equipment which have many unique and advanced operating features.

*The Heavy-Media Separation Processes are licensed by the American Zinc, Lead and Smelting Company. American Cyanamid Company, 30 Rockefeller Plaza, New York 20, N. Y. are their sole Technical and Sales Representatives for these processes.

LINK-BELT COMPANY Chicago 9, Philadelphia 40, Pittsburgh 19, Wilkes-Barre, Huntington, W. Va., Denver 2, Kansas City 6, Mo., Cleveland 13, Indianapolis 6, Detroit 4, St. Louis 1, Seattle 4, Toronto 8.

COAL PREPARATION AND HANDLING EQUIPMENT

Engineered, Built and Backed by LINK-BELT

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Reduction in bit cost ranging up to 91⅔%.

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The number of bit changes required, and the cost of changing and spotting bits reduced as much as 96%.

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A Moxahala, Ohio mine, operating in the No. 6 seam, reports that the bit cost per ton of coal mined has been reduced from 12¢ to 1¢ by using Kennametal cutting machine bits.

In the number 9 seam in Kentucky, bit cost has been reduced up to two-thirds. In the Powellton, Pittsburgh, and Winifrede seams in West Virginia, mines report reductions that average 50%.

These are typical performance facts—hundreds of mines are recording similar savings in material costs by using Kennametal bits—the only bits that have cutting edges of solid Kennametal, the hardest metal used in mining.

The cost of bits is important. Of equal importance in reducing mining costs are the other benefits gained by using Kennametal bits, as described at the left.

These benefits add up to better balanced operations. The cutting crew cuts coal instead of changing bits . . . keeps coal available for loading and hauling. There's less unproductive down time and waiting all along the line.

Our mining engineer in your district will be glad to show you what Kennametal bits can do in your mine. Write for a demonstration. Mining Division, Kennametal Inc., Latrobe, Pa.

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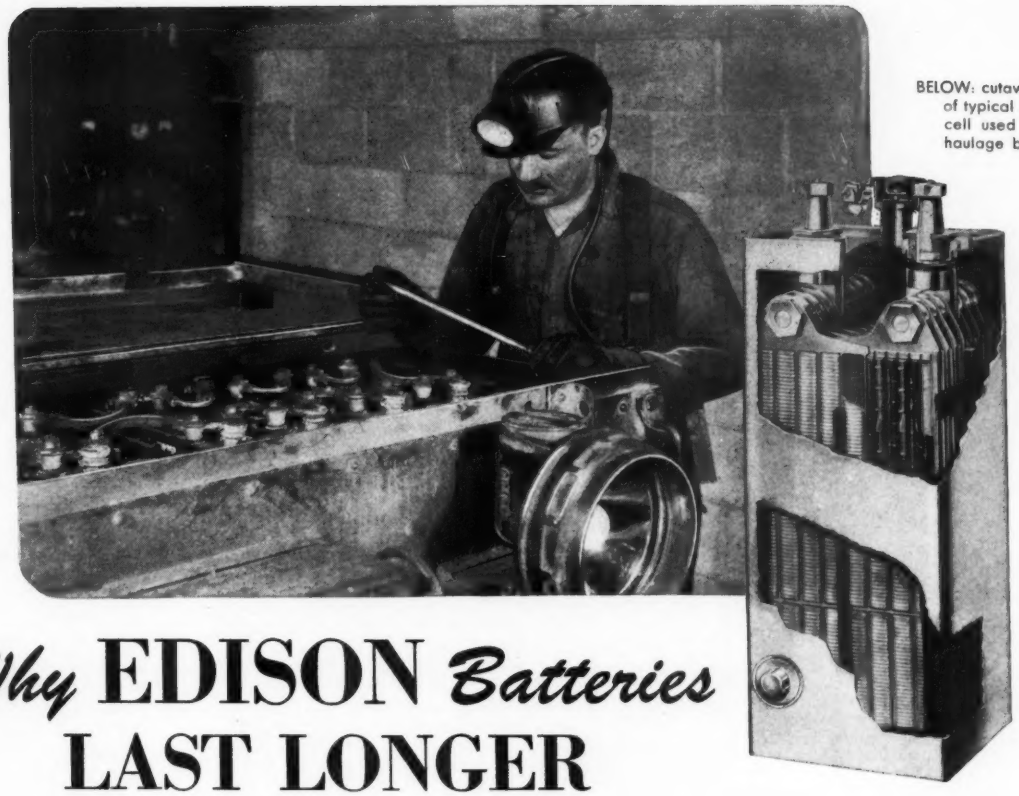
THE WORLD'S LARGEST MANUFACTURER OF CEMENTED CARBIDE MINING TOOLS



BELOW: cutaway view of typical EDISON cell used in mine haulage batteries.

Why EDISON *Batteries* LAST LONGER

WHAT enables an EDISON Battery to stay on the job, out of the repair shop—to see a mine locomotive or shuttle car through its strenuous duty day after day, year after year with maximum dependability? What makes an EDISON Battery give long life and low haulage cost in spite of the hardest usage?

One of the many answers is its rugged, precise cell construction. Cell containers, covers, pole pieces and other structural parts are made of STEEL. Even the active materials are permanently locked in perforated STEEL tubes and pockets. These in turn are securely assembled into STEEL grids to form the negative and positive plates. Every STEEL cover is welded to its container, proof that no internal trouble is anticipated for the normal life of the cell.

Case histories show that EDISON Batteries in mine haulage service have fallen down shafts and gone through many wrecks with little or no damage . . . *and still delivered their full service life.* The fact that they can withstand such accidents indicates the extra dependability that can be expected of them under more normal conditions.

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ADVANTAGES OF EDISON NICKEL-IRON-ALKALINE BATTERIES:

They are durable mechanically; can be charged rapidly; withstand temperature extremes; are foolproof electrically; can stand idle indefinitely without injury; are simple and easy to maintain.

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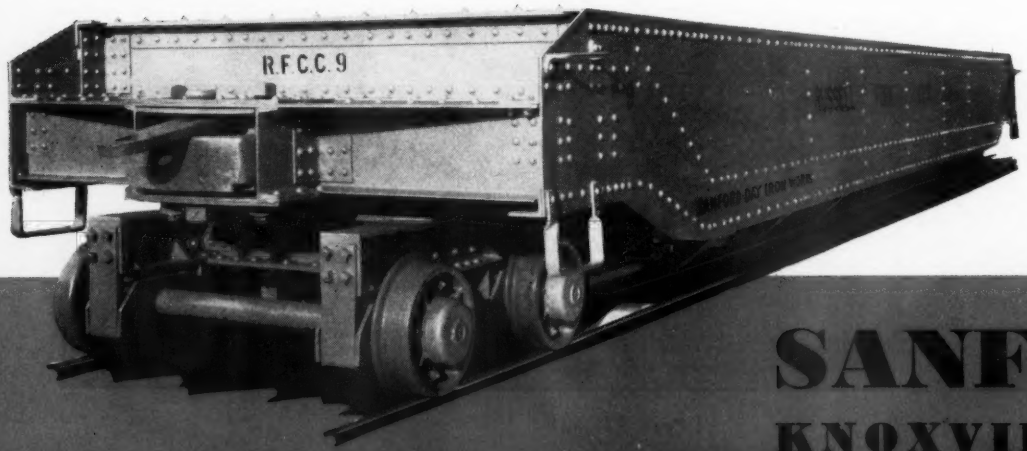
60 THOUSAND POUNDS OF COAL PER CAR

This is the largest automatic bottom-dumping car ever built for conventional coal mine use. It is one of the cars designed and built for the Russell Fork Coal Co. Its length is 39 ft. 8 in.; Width 8 ft.; Height 4 ft. 4 in. above track and, bear in mind, it rides on eight S-D "FLOATER" BALL BEARING DEMOUNTABLE WHEELS.

THIRTY TONS OF COAL, including surcharge, pass through its six doors, almost instantly, when doors are tripped. The doors are provided with two sets of latch hooks—one set for each three doors. This *extraordinary safety feature* is made possible by our new improved "Jerk-out" latch and tripping device. The "Jerk-out" works entirely under the car with foolproof, *safe* operation.



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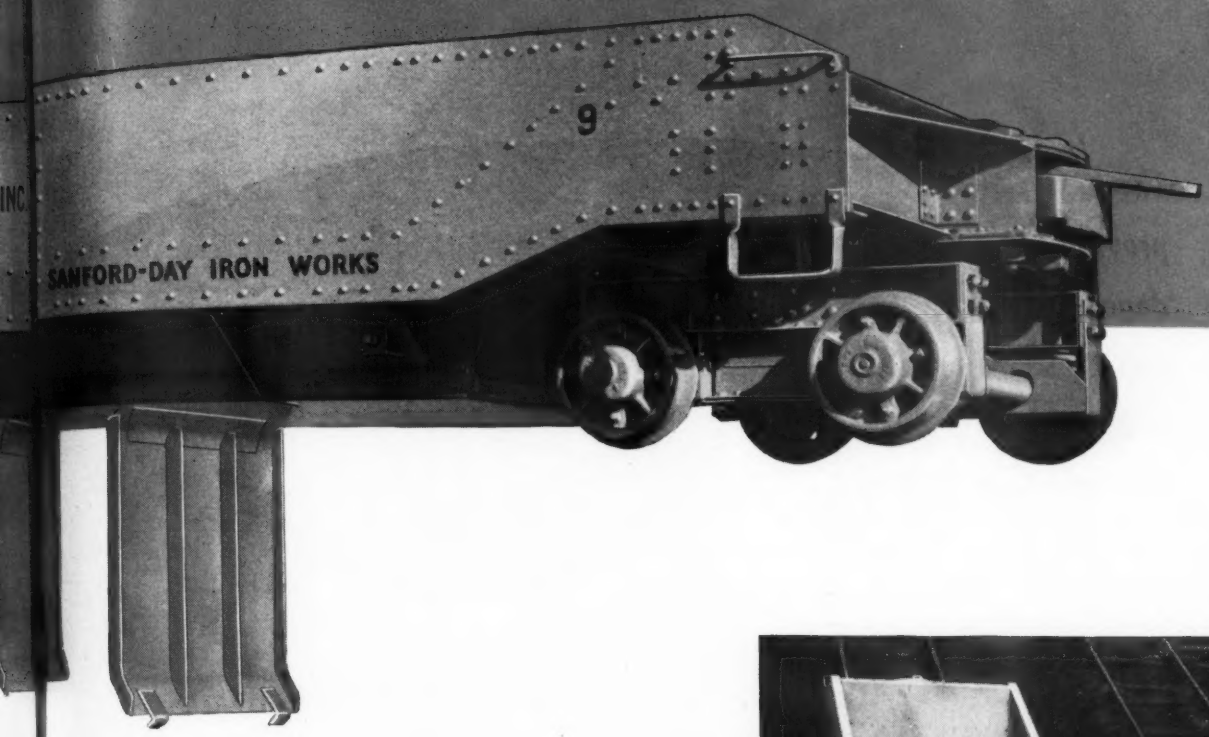
KNOXVILLE,

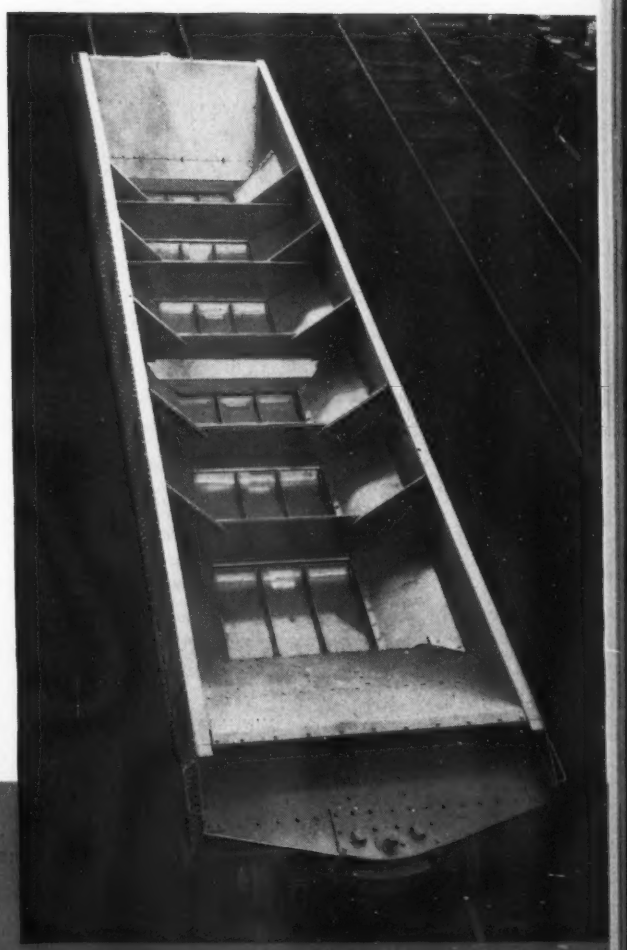
The Largest Automatic Bottom-Dumping Car Ever Built For Regular Coal Mine Use



Stop and Think—"Can Your Mine Use 30-Ton Cars?"

Increased production at the least possible cost is vital today. This is a well known fact you already know. Not every mine, of course, can use a car of this capacity. However, many operators are overlooking the great economies offered by BIG S-D "Automatics." The trend is to larger cars. Many mines are seriously studying the possibility of using them. We will be glad to discuss the details with you without obligation.

If any change-over is planned in your mine, you will profit tremendously by changing over to the industry's most modern and efficient car — the S-D Automatic Bottom-Dumping Car . . . built to meet your particular requirements, large or small.



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Mining Men are in agreement as to its practical value... Our clients are in agreement as to the many advantages in contracting their core drilling to the Longyear organization

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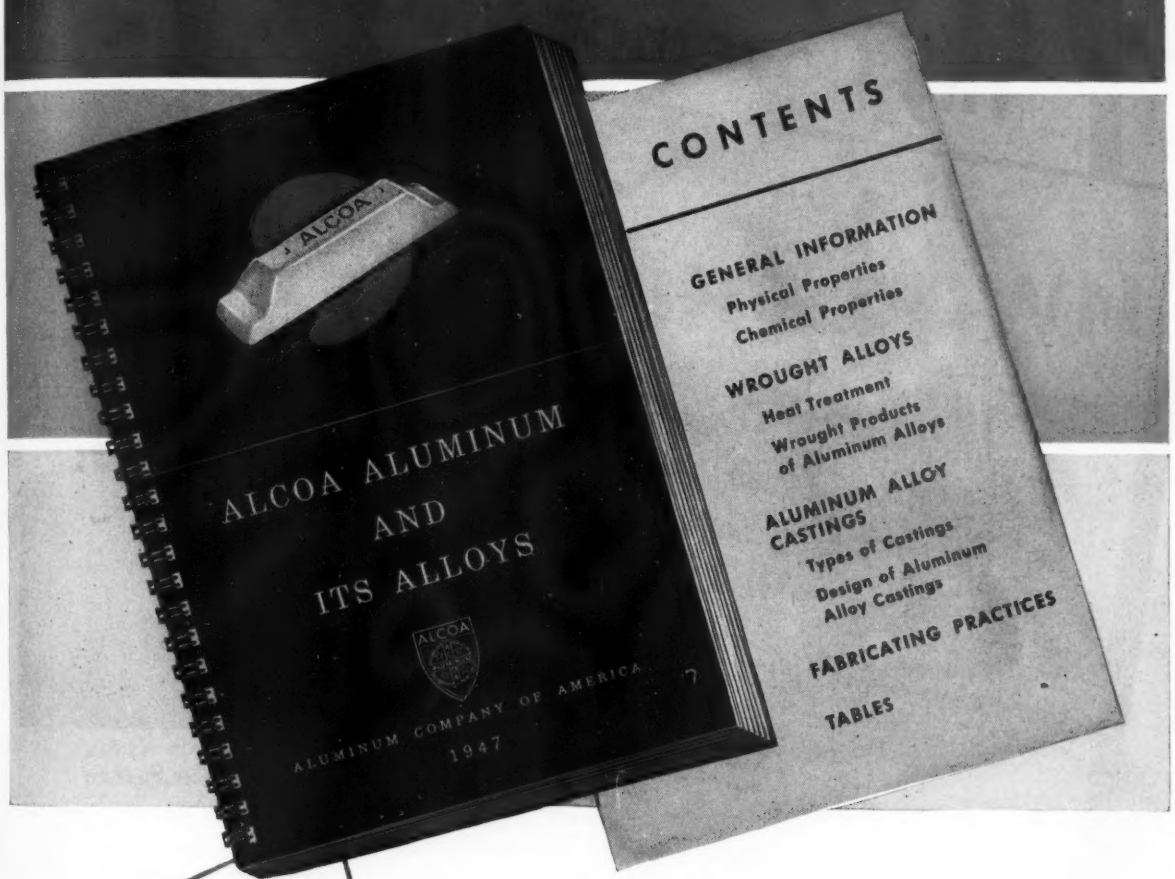
CHOCK-FULL OF THE LATEST DATA ON ALUMINUM



Cages, skips, roof beams, and other mine equipment are equally strong, only ½ as heavy as steel when built of Alcoa Aluminum. Made in all commercial forms. Fabricate in your shop with standard tools.

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HERBERT B. MAW
GOVERNOR

To American Industry:

The State of Utah takes pleasure in presenting to American Industry an opportunity for new development and expansions.

The State of Utah prides itself on the quality of its people, the tremendous extent and ready availability of its raw materials, its unlimited power resources, its unequaled transportation facilities, and its friendly attitude toward business.

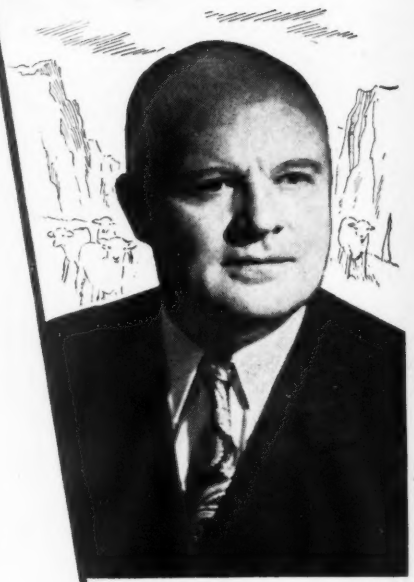
These factors, together with the advantages of living under ideal home surroundings in the nation's most interesting area, has already induced many fine industries to locate in our State.

A new industrial economy is developing in our commonwealth based on the substantial foundations of the basic materials available and the happy and contented people constituting the human resources.

The establishment of your business in Utah will give you an opportunity to share in this new industrial economy and to participate in the growth already experienced in the west.

Sincerely yours,

Herbert B. Maw
Governor



Herbert B. Maw

** One of a series of advertisements based on industrial opportunities in the states served by Union Pacific Railroad.*

Unite with Union Pacific in selecting sites and seeking new markets in California, Colorado, Idaho, Kansas, Montana, Nebraska, Nevada, Oregon, Utah, Washington, Wyoming.

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Securityflex

takes it

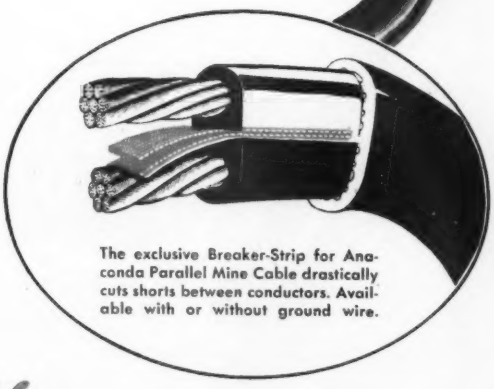
LYING DOWN!

THE ESTABLISHED LEADERSHIP of Securityflex* Parallel Mine Cable in the mining industry is the result of basic superiority in construction . . . and performance.

Anti-Short Breaker Strip between conductors cuts shorts to a minimum. Adhesion between jacket and insulation, by a special process, makes a *solid block* of heat resisting rubber and neoprene around conductors. Rugged, neoprene jacket resists flame and abrasion—cable meets all requirements of the Bureau of Mines Flame Test and diameter specifications. Will not kink, twist or tear.

The cable that can take it lying down, Securityflex, makes mines safer, more efficient. Just try it . . . you'll specify it from then on. 48409

*Trade-mark



The exclusive Breaker-Strip for Anaconda Parallel Mine Cable drastically cuts shorts between conductors. Available with or without ground wire.

ANACONDA *Securityflex* **MINE CABLE** ANACONDA

Anaconda Wire & Cable Company, 25 Broadway, New York 4, N. Y.

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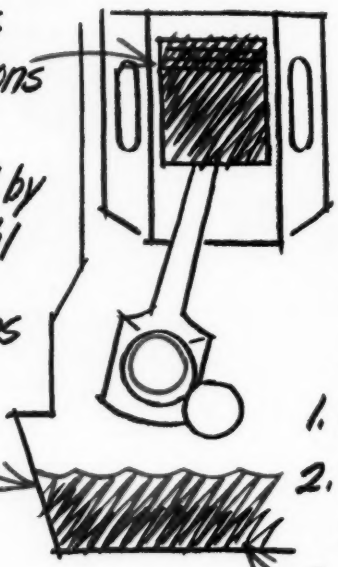
Hot oil oxidizes fast, gums pistons

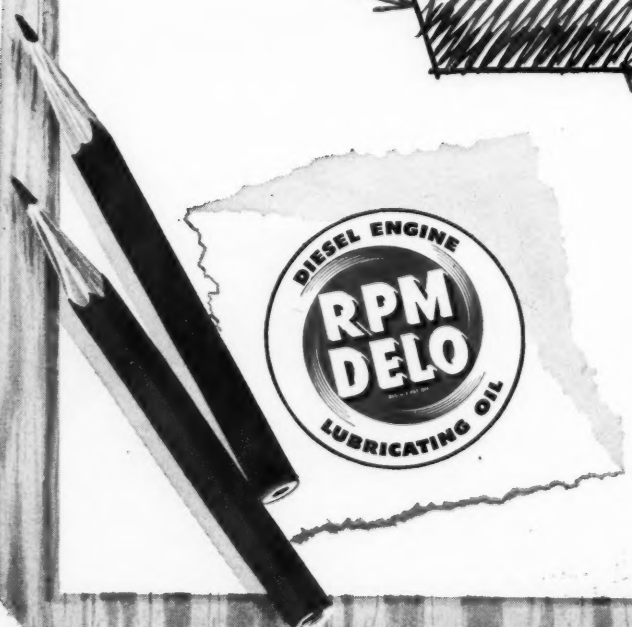
Sludge formed by ordinary lube oil insulates crankcase, keeps oil hot



Foreman says try RPM DELO Diesel Engine Lubricating Oil – its compounds stop sludging 3 ways:

1. Oil oxidation slowed up
2. Gum and lacquer cleared out.
3. Contaminants held in suspension – flushed out when oil is changed.

Tell foreman OK to order RPM DELO Oil



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STANDARD OF TEXAS • El Paso, Texas

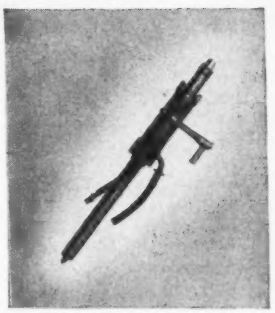
BLUE BRUTE BALANCE SPEEDS UP DRILLING

A single compact unit, this Blue Brute WPM Drifter incorporates the Pneu-Motor feed with the drifter itself. This *scientifically balanced* distribution of weight dampens recoil, relieves stress and wear on the guide shell, eliminates excessive vibration and whipping.

Other WPM Pneu-Motor design advantages are: Feed nut driven by simple spur gears, no ratchets, pawls or springs — only one air hose — feed and drifter controls on the end of the drifter for easier handling. The drifter has the famous positive-acting, end-seating, time-proven Worthington automatic valve.

Hard sluggers all the way, WPM Drifters have the *balance* that speeds up drilling cyles, increases footage and lengthens drifter-life. Like the other Blue Brute Drifters — WPMS (Pneu-Motor on shell) and WHC (Hand Crank)—the WPM comes 3″, 3½″ and 4″ cylinder sizes, with standardized mountings that take all three sizes.

Get further facts proving there's more worth in a BLUE BRUTE. Write for literature describing the complete line of BLUE BRUTE Mining Equipment, including Drifters, Stopers and Hand-Held Drills. HS-20



BLUE BRUTE STOPER

Self-Rotating Model WR-31 is well balanced, easily handled and has many features that make it a favorite with mining men. Fully described and illustrated in Bulletin H-1200-B30.

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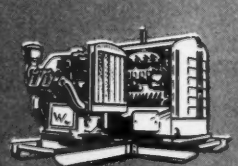
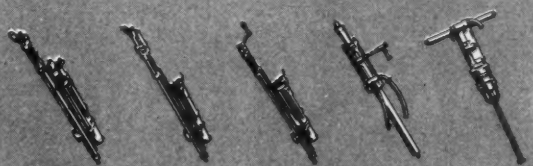




Semi-Portable Compressors. Drifters with Feed Motor Incorporated. Drifters with Feed Motor on Shell. Hand-Crank Drifters. Stopers. Hand-Held Rock Drills.

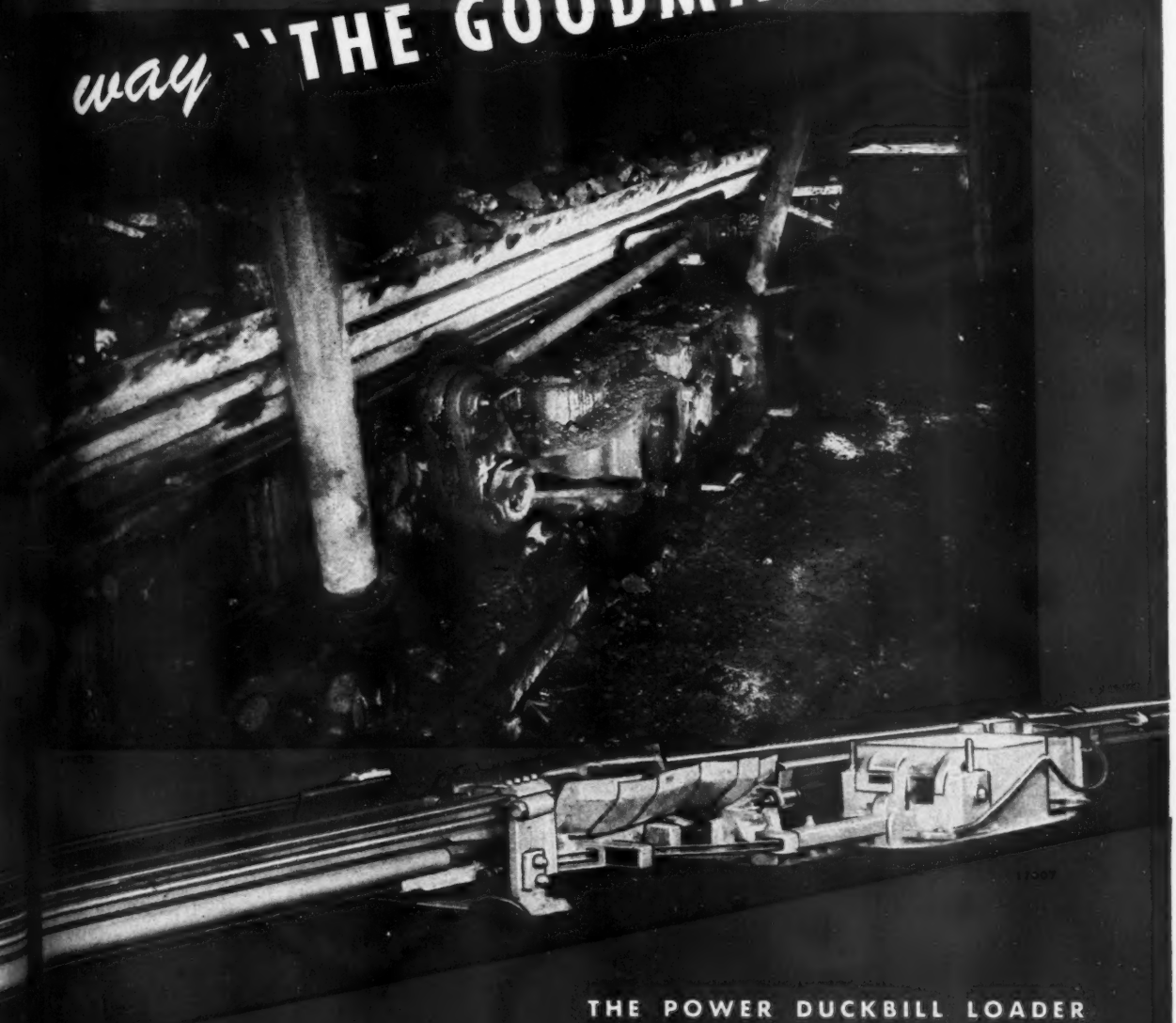
WORTHINGTON

Worthington Pump and Machinery Corporation, Worthington-Ransome Construction Equipment Division, Holyoke, Mass.

Distributors in all principal cities

All the
THE 512 SHORTWALL WITH BUGDUSTER
Designed for the toughest cutting, plus automatic handling of slack, this machine operates efficiently with low maintenance cost. It eliminates hand shoveling, leaves a clean kerf, gives you practically dust free cutting.
SHOVELING DAYS ARE OVER WHEN THE GOODMAN BUGDUSTER IS PUT TO WORK
GOODMAN MANUFACTURING COMPANY

way "THE GOODMAN WAY"

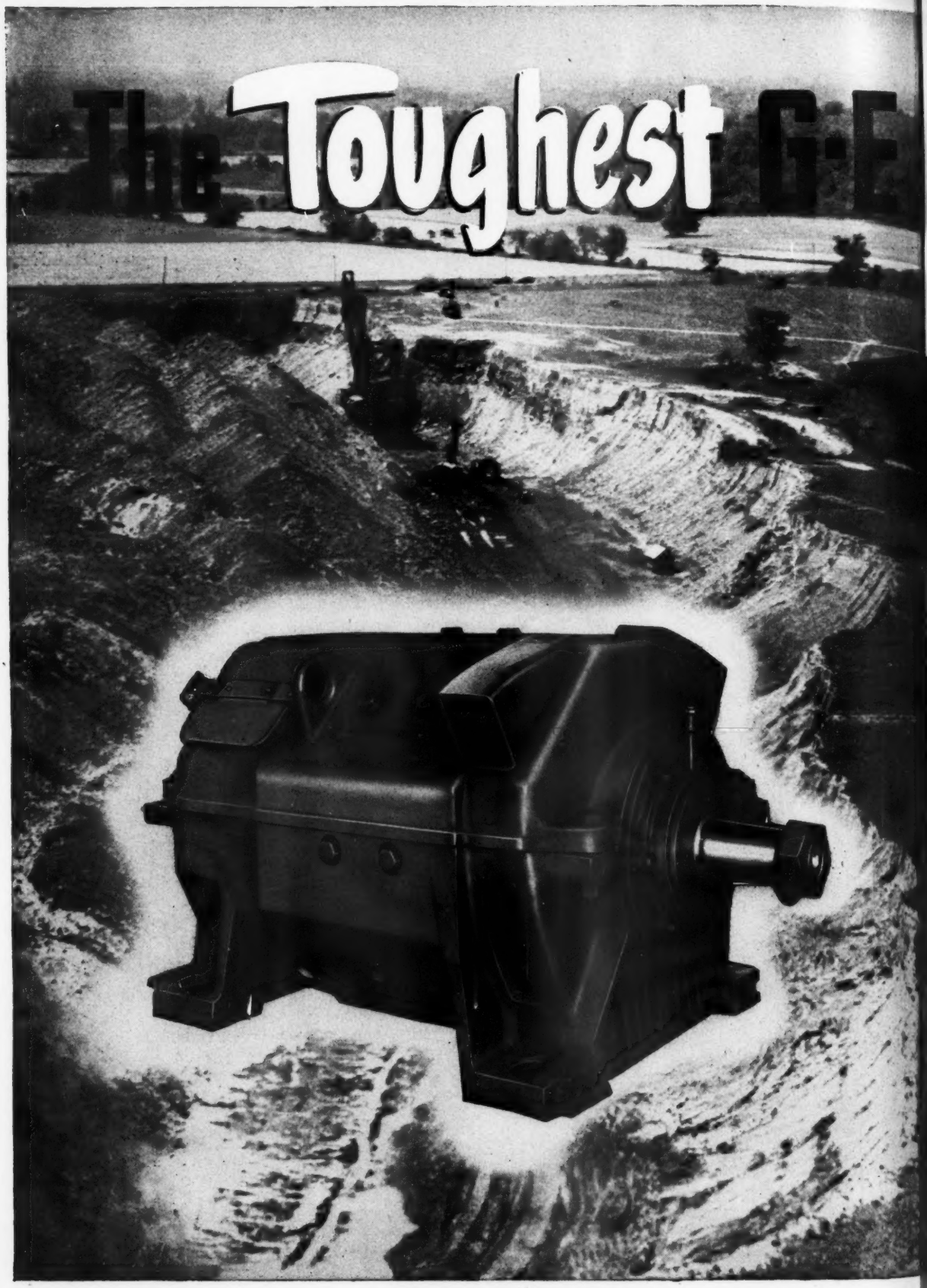


THE POWER DUCKBILL LOADER

Here, in effect, is a mechanical loader with a rear conveyor as long as the room is deep. It loads out a room easily, with a series of fast, power controlled moves. There is a continuous flow of coal from the face, back along the conveyor line, to the entry.

HALSTED STREET AT 48TH • CHICAGO 9, ILLINOIS

In England **UNITED STEEL COMPANIES, LTD.**


The Toughest G-E

Shovel Motor Ever Built

- Carries heavier loads safely
- Gives you more horsepower per frame
- Costs less to maintain

The new General Electric MD-600 shovel motor is the strongest, the best electrically balanced, and the most easily adapted shovel motor we have ever offered manufacturers and users of stripping shovels. Its new mechanical and electrical features will mean smoother shovel operation, less maintenance, and lower stripping costs.

The MD-600's frame is sturdier than that of any previous G-E design. The bearings are designed for a wider safety factor and greater capacity. Better commutations at all loads and speeds characterize this new motor. It is lighter and shorter and, most important, it gives you more horsepower per frame size, thanks to new design and insulating techniques.

The new MD-600 is one more good reason for specifying that your next stripping shovel be "General Electric equipped." Bulletin GEA-4654 gives all the details. It's yours for the asking. Write to *Apparatus Department, General Electric Company, Schenectady 5, N. Y.*

● **HINGED TOP**—The top half is hinged to the bottom half in frames 601 to 612 for easy inspection and repair of armature. Because of weight, heavier frames are split, but not hinged.

● **BEARINGS** — Single-width, solid cylindrical roller bearings are used in all sizes. All bearings are protected by dust-proof frameheads.

● **ARMATURE** — Low armature inertia (Wk^2) insures more horsepower output for the job. Lifting bails facilitate removal of the armature.

● **SHAFT**—The entire armature, with commutator, is assembled on a spider—a sleeve of seamless steel tubing or hollow-bored shafting—into which the shaft is pressed and keyed. Thus, the shaft can be pressed out without any disturbance to the commutator or winding.

● **FRAME**—Heavy cast-steel frame withstands severe service. It is equipped with lifting bails and with pads on both ends to mount a G-E brake.

● **BRUSH HOLDERS** — Box-type brush holders are used. All brush-holder supports are doweled and bolted, and are in a fixed position for reversible operation. Easy-to-remove plates and hinged frame make cleaning and repairing of brushes quick jobs.

● **UNIVERSAL BEARING HOUSING**—Universal bearing housing accommodates all standard makes of roller bearings without special machining.

● **COILS**—All field coils are heavily insulated throughout with mica and glass. Armature coils are insulated with silicone-binder mica tape, with glass tape for over-all protection.

GENERAL ELECTRIC

657-85

FOR POWER . . . FOR HANDLING EASE

CHAMPION

OF THE FEATHER WEIGHTS

Thor

NO. 28 SINKER ROCK DRILL

(30 Pound Class)

The better the tool the more places you'll find it. That's the secret of the amazing acceptance of the Thor "28"—its exceptionally powerful rotation for such a small and compact drill (30 pounds in 18-¼") have carried its popularity from secondary drilling in the mine and quarry to the general construction field . . . to industries for general maintenance and drilling anchor holes for machinery installations. Try the champion . . . *first.* Call a Thor dealer for a demonstration.

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AUTOMATIC LUBRICATION

FORGED STEEL

FAST BLOWS

. . . Thor PORTABLE POWER TOOLS

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Big selection . . . Handy supplies
Crane piping equipment for Mines

ONE
SOURCE OF SUPPLY
RESPONSIBILITY
STANDARD OF QUALITY

The widest choice of equipment that's best for your needs. Valves, fittings, pipe line accessories and pipe—in brass, iron, steel, or alloys. That's what you get in the Crane line—supplied through your local Crane Branch or Wholesaler.

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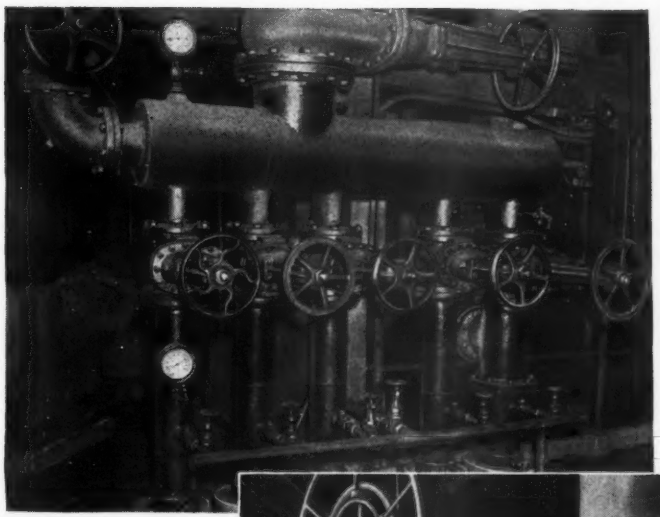

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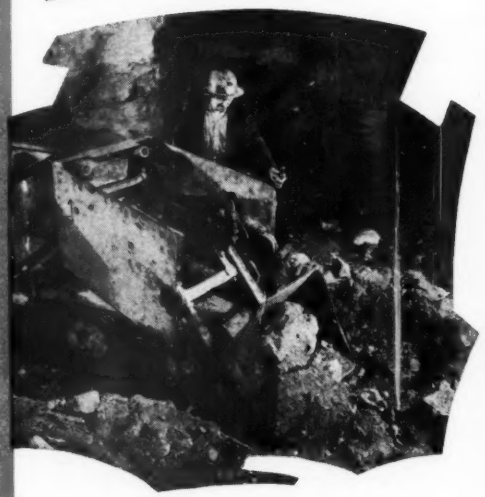

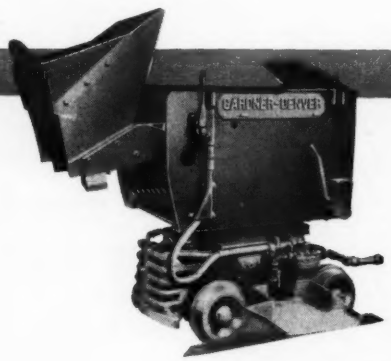

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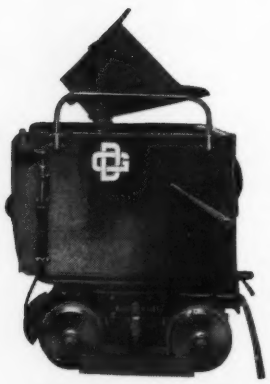
For complete information, write Gardner-Denver Company Quincy, Illinois



Gardner-Denver GD9—another popular loader

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SINCE 1859

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Must Mercury Mining Die?

LEGISLATIVE and executive indifference to domestic mercury mining is slaying a vital industry. Already at a dismal low in the face of prices established by the Spanish-Italian cartel, the industry can only cast a jaundiced eye upon rising Yugoslav competition with "Mercurio Europeo." While these various European producers cut prices in their scramble to secure credits payable in dollars, they also achieve the result of making our economy entirely dependent upon their production as a source of quicksilver. We may hope, but without any certainty, that this result is not their major objective.

In any event, if domestic mercury mining is allowed to die and ever a future emergency faces us, there will be late and lusty wails of mourning from our war industries.

Let's see what has been taking place to force mercury mining into the struggle of operating at 1938 prices with 1948 costs. In January 1946, mercury sold at $105 per flask and underwent an almost steady decline to $83.50 at the end of the year. During 1947, in addition to imports from established sources, a further narcotic was administered by dumping the Japanese mercury stockpile on the open market.

From a price of $79 per flask at the close of 1947, quotations have further declined to range from $75 to $78 per flask. Italy has a stockpile of an estimated 30,000 flasks and made offers in March at $73 per flask, duty paid in New York, with tentative proposals to cut that price if necessary in order to sell.

Obviously the doubtful outcome of the Italian election had a potent influence on Italian mercury prices prior to April 19. Had the April election resulted in the success of the communists, this huge stockpile would have been valueless. Even now, the lack of stability in Italy encourages sales at any price as long as it is payable in dollars. The fact that Italy possesses 50 per cent of the world's productive capacity of mercury may have considerable bearing upon Russia's desire for control.

According to the most recent official figures, which are for March 1948, more than 2000 flasks of metal were imported in that month. During May, about 12,000 flasks of Spanish metal entered along with additional imports from Japan, Mexico, and Italy. With average annual consumption about 30-35,000 flasks, the imports during the months of April and May, barring expanded usage of the metal in the mercury turbine and other new developments, should be ample to supply the nation's needs for half a year.

Mercury is an essential ingredient in the array of raw materials required for the prosecution of war. If war comes, it is highly probable that shipping hazards will place European mercury in uncertain if not impossible supply. In the light of this contingency, what is actually taking place in quicksilver mining within our borders is of the greatest importance.

Only three or four mines are operating, and these are contemplating closure as hope for an improved market price fades. The richer ores are being mined and ore profitable to mine before the war is being left untouched. Cordero has already shut down following a fire which gutted the change house and damaged the shaft. Bonanza and Hermes are operating with a skeleton crew and anticipate a shutdown on June 1. New Idria is preparing for closing July 1, and the possibility of long-continued operations at Sonoma is doubtful. This will be the end of an industry active for over 100 years.

Mr. Schuette, an authority on mercury, points out on page 31 of this issue the fact that successive wars bring about greater demands for mercury. Stockpiling of mercury is a partial answer to the problem of supply. A more important segment of the picture is the stockpile of know-how.

Once closed, mercury mines will fill with water, equipment will be sold or will deteriorate, and experienced crews will scatter. When the men with the intimate knowledge of these deposits disperse, then the Nation has a real reason for concern.

In 1939, a healthy quicksilver industry was urged to greater production and within four years was able to produce at the rate of 5000 flasks a month. After a complete shutdown, only at great cost and with considerable delay can an effective industry be built anew.

If domestic mercury mining is to meet the demands that will surely be placed upon it in the event of national emergency, a minimum nucleus of a healthy industry must be maintained. One suggestion to this end, advanced by quicksilver producers with considerable persuasiveness, would call for "underground stockpiling," with the Government providing an incentive to develop and maintain quicksilver reserves in mines kept in a "going" condition—and at the same time reducing the incentive to exploit such reserves—at a cost not out of line with maintenance charges on aboveground stockpiles.

Whatever the best solution may be, the basic question—"Does the Government want to keep the quicksilver industry alive?"—calls for an answer in the very near future.

A hoist drum-deck section goes into the mine

Solving the Mechanical Problems of a Shaft Installation

Design Features of Bunker Hill's 1200 HP Hoist

By WENDELL H. DENLINGER
Mechanical Engineer
Bunker Hill & Sullivan Mining & Concentrating Co.

WHEN deep developments at the Bunker Hill mine disclosed new orebodies, larger capacity hoists became necessary. In addition to the problem of the installation of the new 1200 hp hoist, many problems in mechanical designs were presented and solved. Although such design problems are largely in the realm of the mechanical engineer, mining engineers should be familiar with their solution in order to be able to integrate successfully the details of similar problems in hoist installation.

Two main shafts at the Bunker Hill mine served the 200 ft interval levels for many years and until the discovery of new orebodies on the No. 19 and No. 21 levels, in 1937, no need was anticipated for increasing the capacities of the existing hoists. The No. 1 shaft, inclined 50 deg with the horizontal, is used for an ore hoist and the White Raise, inclined 41 deg, is used as a supply shaft. These shafts are 460 ft apart at the collars. The hoist serving these shafts are located about two miles underground on the No. 9 or main haulage level which is an elevation of 2400 ft above sea level and lies under a high ridge on the surface. In 1937, the No. 1 shaft had been sunk to the No. 21 level and the White Raise was down to the No. 19 level.

Hoisting in the No. 1 shaft was being done with an 800-hp, double-drum, Coeur d'Alene hoist equipped with two 300-hp, a-c motors. It had a rope speed of 1000 fpm, handled 6 tons of ore per skip, and used 1⅛-in. rope. Hoisting in the White Raise was being done with a 150-hp, Coeur d'Alene hoist. No. 21 level is at zero elevation or 2400 ft below the hoist room on No. 9 level, or 3200 ft on the incline.

In order to maintain tonnage at this depth, skip capacity had been increased from 5 to 6 tons and the skips were lightened. Skip capacity was increased by installing stringers in the shaft so that the bottom of

the skip could be made even with the top of the rails, and by using short axles held on the side of the skip by heavy, cast-steel angle brackets. The body was made of 3/16-in. Cor-ten steel with ¼-in. liners. Even with these changes skip and rope wear was becoming excessive and it was soon realized that the limit in depth and skip capacity possible with existing equipment had been reached.

Plans for a new hoist incorporated the following:

(1) Purchase new equipment for the No. 1 shaft capable of hoisting ten tons of ore per skip at 1500 fpm from an ultimate depth of 4000 ft below the collar of the shaft. Equipment of this size would hoist 2000 tons of ore per 16 hr from No. 29 level and allow 8 hr for handling the shift, occasional riders on the skip, and for maintenance. Additional tonnage could, of course, be hoisted from levels above No. 29.

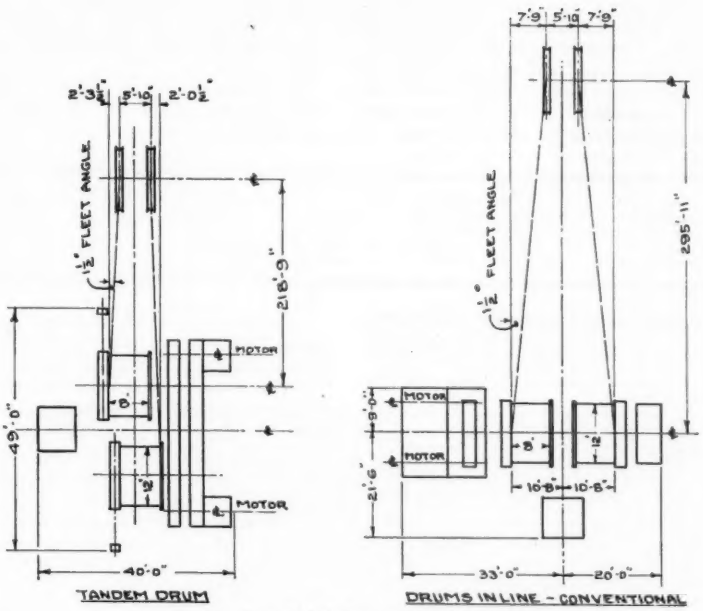
(2) Replace the present 150-hp hoist at the White Raise with the 800-hp hoist then serving the No. 1 shaft.

Hoist Selection

The work was authorized in August 1943 and a study made of the type of hoist to use. The depth and load required a 1⅝-in. rope and a 12-ft diam by 8-ft face drum to wind the rope in three layers.

Two types of hoists were considered. One was the conventional hoist with both drums mounted on a single shaft and powered by two motors which drive the main gear through two pinions. This arrangement, as compared to a single motor drive, reduces the motor size so that it can be transported through a smaller tunnel. The tooth pressure is smaller and the face width of gear and pinion is likewise less. The bending load on the drum shaft due to tooth pressure is eliminated since the two pinions act as a couple. Herringbone teeth are commonly used for this application. The over-all dimensions of the conventional hoist measure 53 ft by 30 ft 6 in. Hence the arch beams would have to run crosswise to the shaft to secure the smallest arch.

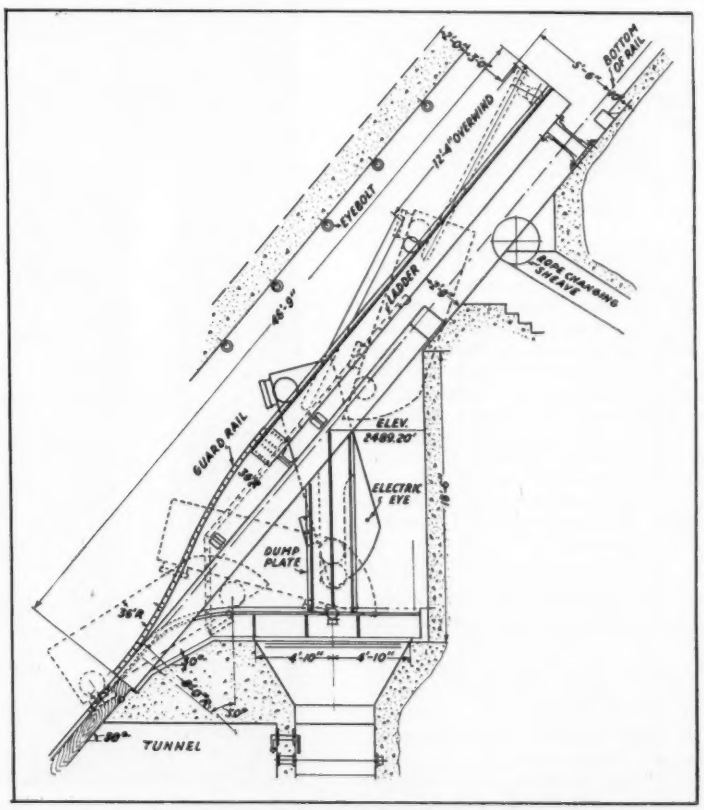
In the tandem-drum type, one drum sets to the rear and right of the other. Two motors are likewise provided for this hoist and they drive the drums through two pinions, two main gears, and an intermediate idler gear. Helical gears have been found to be the only satisfactory type to use in this design, and thrust bearings must therefore be provided. A shorter drum shaft may be used with this design. For this type of installation the arch runs parallel to the mine shaft but the actual size of the hoist room comes out about the same in both cases.



Tandem type installation requires less room

Among other advantages, the tandem-drum installation allows a shorter distance to the sheave wheels both on the hoist side and the shaft side, with some savings in rock breaking and rope. The area of the rope raise is less.

A comparison of distances and the size of rope raises at the lower end for both types of installation is based



Skip dumps provide for smooth, safe operation

on the same rope raise slope of 38 deg. With tandem-drum hoists, the overwind rope crosses the underwind rope for about half the distance up the ropeway. Hence, there must be a good separation of the two ropes and the rope raise must not be too flat.

Type Drums	Rope Raise Height	Rope Raise Width	Area	Drum to Sheave	Collar to Sheave	Idler Sheaves
Tandem	23′	14′	322	218′- 9″	184′	2
Conventional	17′	25′	425	295′-11″	232′	4

BUNKER HILL SPECIFICATIONS FOR HOIST TO RAISE MAXIMUM OF 2000 TONS UP 6000 FT IN 16 HR.

Type—Tandem Double Drum
Weight of ore—20,000 lb.
Weight of skip—8000 lb.
Length of shaft along incline—6000 ft
Rope—1⅝ in. Roebling Lang Lay Blue Center
Weight of rope—25,380 lb.
WR^2 of revolving parts—5,000,000 lb. ft^2
Drum size—12 ft diam by 8 ft face grooved and designed to wind the rope in three layers
Acceleration and retardation—15 secs each
Dumping and loading—10 secs minimum
Size of brakes and clutches—13 ft
Hoist motors (2) 600 hp, 600 rpm, 250 v dc
Type of control—Amplidyne

In 1943 an order was placed for a Nordberg hoist sectionalized to go through the Kellog tunnel. Delivery was estimated at one year. The shipping weight of the hoist was 436,000 lb and required 12 carloads. The General Electric Co. furnished the electrical equipment. When the equipment arrived the ground work was incomplete and special sheds were built to store the hoist for later installation.

Work Sequence Plan

The site chosen for the new hoist room was back of the room cut for the 800-hp Coeur d'Alene hoist and at sufficient distance to allow a good rock pillar between it and the new ropeway, and to allow room for the new head sheave and dump. Much of the new installation had to be cut in old and broken ground and where present equipment was located. In order to avoid an interruption of ore hoisting, the work followed the following sequence:

(1) Run drifts to new hoist stations.

(2) Cut Nordberg hoist room, generator room, rope raise, and sheave room.

(3) Sink rope opening down from Nordberg sheave through arch of Coeur d'Alene hoist sheave room.

(4) Concrete hoist room, generator room, and sheave room.

(5) Install Nordberg hoist, generator, and head sheaves.

(6) Cut new ore pockets.

(7) Connect Nordberg ropes to old skips and hoist ore temporarily with them.

(8) Remove Coeur d'Alene hoist head sheave, complete ore pockets, and install new dump.

(9) Remove Coeur d'Alene hoist dump, bridge over old opening, and install new 10-ton skips. This operation was the only one that required a shutdown and it was only for a few days.

(10) Plug old dump with concrete.

A drift leading off from the main haulage tunnel to the new site was started as soon as the work was authorized. This draft was continued on to the site of the future new White Raise hoist room.

Reinforced concrete end walls of the hoist room are made with counterforts. The end walls of the generator room have a single pilaster at the center.

Where a lining of concrete was to be placed, forms were built for the inside only and the intervening space pumped full of concrete with the Pumpcrete machine. This was intended to seal the face of the rock and prevent air slack.

The closest spacing of reinforcing bars that could be used and still insure each bar being completely embedded in concrete was found to be 3 in. for ¾-in. bars. Using this amount of steel with three inch embedment, and a ratio of steel to concrete of .0063, the wall thickness comes out 26 in. In some places where there was a heavy overbreak, or where old concrete was removed, the wall thickness amounted to 4 ft. The balance of the concrete was regarded as filling.

When hoists of this size are installed on the surface, they are commonly set in the floor with a pit underneath. The floor of this hoist room is above the drift level so that all trenches have a drainage grade out of the hoist room and generator room. The hoist bearings are set on piers resting on a heavy reinforced concrete slab that extends under the entire hoist. The entire floor of the hoist room and generator are on the same level, except

Pickleboat transports 22 men at a time

for the trenches and they are covered. This makes for easy cleaning and accessibility.

The platform is 9 ft-1 in. above the floor, the same height as the shaft center line. The hoistman sits comfortably at a console on which are mounted the short control levers. Being elevated above the floor in this manner, the huge size of the machine is accentuated. The arched roof, 28 ft above the floor at the center and with arched doorways, give a cathedral-like appearance to the plant. A finished surface was put on all the concrete and all the interior was painted a light gray. Fluorescent lighting was installed to insure ample illumination.

The arch of the generator room runs the same way as the hoist room, is located back of it, and is connected by a short drift. A straight track through the generator room into the hoist room carried in the hoist parts and electrical equipment.

Electrical equipment in the generator room is placed on a floor 6 ft above the track level. A 16,000 cfm suction fan located under the floor draws fresh air into the hoist room from the drift in front and into the generator room through the generators and synchronous motor which have covers, and discharges it out the main haulage tunnel.

Dump Operating Features

In the design of the dump and ore pockets, the following features were included:

(1) Maximum resistance to ground pressure

(2) Smooth skip turnover in minimum time

(3) Provision for skip overtravel and still not be caught on dead center

(4) Provision for quickly and smoothly coming out of the dump without a big rope sag resulting

(5) Provision for dumping both skips into either ore or waste bins, or separately

(6) Provision for lining at the wear points

(7) Means of indicating to the hoistman when the skip was in the dumping position and when the bins were full.

Over the dump a concrete arch 2 ft thick and reinforced with ¾-in. bars on 3-in. centers, supports the ground. The sidewalls of the dump are 3 ft thick minimum and are reinforced with ⅞-in. bars. These walls were necessarily quite high in order to allow a clear space for the long skips to dump. The dump beams are made so that the skip front wheels run out on a level while the rear wheels run up a smoothly curved track.

Upsetting is prevented by providing a rubber-covered roller that engages the front of the skip as it turns over and transfers the front wheels to the guides which are attached to the dump plate. Below the dump beams two hoppers are provided with an air cylinder operated gate. When the gate is straight up, one skip dumps into the ore pocket, one into the waste pocket. The gate can be turned down so that either pocket is closed off and both skips dump into the other pocket. The cylinder that operates the diversion gate is located in a small tunnel.

Here also are located the switches for the bin level indicators. When the bin is full, a bar on the inside is moved. This, through a shaft, turns a mercoid switch in the tunnel. This in turn shuts off an indicator light on the hoist platform.

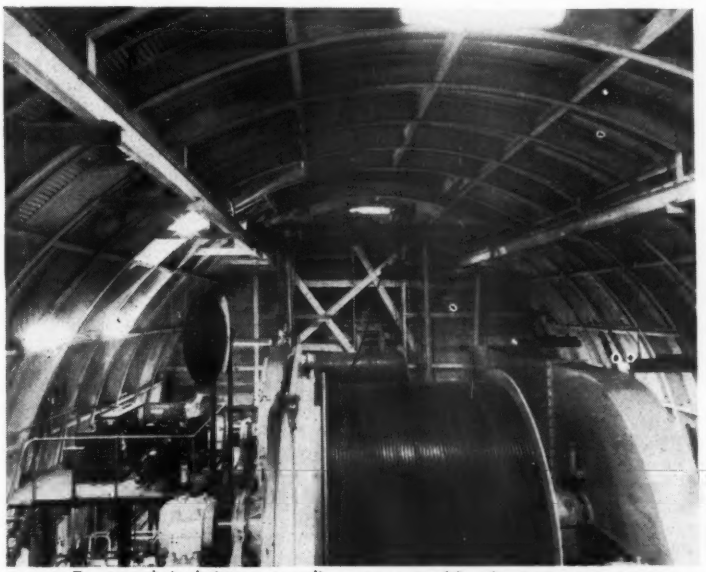
For informing the hoistman when the skip is in the dumping position, an electric eye is mounted on the dump sidewall. The beam is interrupted when the skip dumps and a small red light flickers on the hoist platform.

With a capacity of 385 tons or 5½ trainloads the ore bin is 14 ft in diam. The waste bin is 10 ft in diam and holds 210 tons or 3 trainloads. Diversion chutes at the top and bottom of the bins and the lower part of the bins are lined with 60-lb rails. For fastening them in place, bars were set flush in the concrete and the rails welded to them after the forms were stripped off. When a recent inspection showed that the side walls had nearly worn through the reinforcing bars in one spot, a 1-in. rubber lining was installed to resist the wear.

The hoppers that receive the ore directly from the skips are lined with ¼-in. AR steel plate with ¾-in. rubber lining underneath. They are attached to the concrete with anchor bolts at the top edges.

Skip Design

In considering the design of the ten-ton skip, two dimensions were fixed which affected its volume, width, and height. Hence, its volume could only be increased by lengthening. The skip sides, bottom, and back are made of ⅜-in. Cor-ten steel and the top of ¼-in. Cor-ten. The bottom liner is ¼-in. AR steel with ¾-in. rubber underneath. The rubber is intended to cushion the impact of the ore striking the liner when the skip is filled. Additional reinforcement is provided across the bottom and sides near the wheels to prevent bulging.



Ten-ton chain hoist on traveling crane simplifies hoist maintenance

Riveted construction was used throughout to avoid any welding of the alloy steels and to make repairs possible. The stub shafts of alloy steel are pressed into alloy cast steel angle brackets which are riveted to the skip body.

As the skip bail is quite long it is supported in front on a pony truck. This keeps the bail and side bars from catching on the dump beams and prevents the side bars from striking the skip when it comes out of the dump.

Once skip size had been established the weight could be estimated and the bearings selected, allowing a bearing life factor of at least ten. The maximum load on the bearings was considered when the loaded skip was running in the shaft at full speed since all positions in the dump would be taken when the skip was slowed down. The narrowest possible bearings were required because of the

narrow front wheels. The bearings selected were cylindrical roller and a single-row ball bearing. These are interchangeable in size and by combining these two in each wheel a greater radial capacity was obtained than with the ball bearing alone.

Scale weight of the skip is 11,000 lb and the pony trucks carry 1300 lb of the total weight. With a rope speed of 1500 fpm on the 50 deg incline, the life factor on the skip bearings averages 11.4. The pony truck wheels have Timken car bearings although the bearing load on them is one-third of that when they are used in mine car service.

Having established the bearing size, the cast-steel hubs were designed. To these were added rolled-steel tires, resulting in a wheel size of 17-in. tread diam. Owing to the larger bearing size used on these skips, it was necessary to let the hub project into the angle bracket. The rest of the required space was gained by increasing the overall width across the wheels by 2 in.

The thimble supplied by Roebling is a type that has the pinhole offset, so that the centerline of the live rope coincides with the centerline of the bored hole in the thimble. Side bars and pins are made of SAE 1020. The pin end of the side bar is reinforced with a ½-in. by 7-in. plate welded to each side on the edges of the bar. The pinhole is bronze bushed. The pony truck is provided with handles and a rock shield that is raised when handling the shift. When the skip is being placed in the shaft at the collar, a transfer bar is inserted, portable transfer rails are placed, and the skip runs in on the pony truck wheels and rear wheels, after which the bar is removed. When the skip is being transported on a timber truck from the shop to the mine, the side bars are raised above the transfer bar.

Steps made of 1½-in. square are provided for the use of anyone riding the skip. When the shift is handled, a special ladder is placed in the skip so that it can carry ten men.

For moving the shift, a mancage holding 2 men was built of all-welded steel construction, except for the wooden seats. It is built low to the track to provide maximum head clearance and the upper part is of wire screen to furnish arm protection. The axles are spring mounted, giving it smooth riding qualities. The skip to mancage hookup consists of a double ¾-in. by 5-in. slotted bar which pulls from the center and a safety link on each side. The mancage is parked on No. 15 level where air-operated transfer rails are provided. When getting ready to handle the shift, the transfer rails are lowered, the skip run out on No. 15 station, and the three pins inserted to connect the mancage to the skip. The slotted bar allows the center pin to be more easily inserted. The skip and mancage are then brought up to the collar for loading the shift.

Hoist Rope Problems

Another problem that the new hoist installation entailed was that of rope handling. Formerly the 1⅛-in. rope was 4280 ft long and was received on a reel measuring 5 ft in diam by 3½ ft in length. At maximum depth, a 1⅝-in. rope, 6500 ft long will be required and the shipping reel will measure 9 ft diam by 5 ft-2 in. over-all length and a full reel will weigh about 15 tons. This reel size was entirely too large to be taken in the mine, so special equipment was designed to handle the rope.

On the outside, in a cable storage warehouse, a winding engine operated by an I-R 5-hp geared air motor was built. Winding on an old cable, it drives the shipping reel through a double reduction of sprockets. It is arranged so that the reel and reel shaft can be lifted into the bearings with jacks. It has two brakes for use when unwinding new cables.

For transporting cable through the main haulage tunnel, a cable reel truck was built. It is large enough to hold the longest 1⅝-in. cable and has a drum 5 ft-3 in. diam, 2 ft-8 in. deck diam, and 9½ ft over-all length. It has a band brake for unreeling and an IR 5-hp geared air motor for reeling. The chain and sprocket reduction gives a drum speed of 8 rpm and a rope pull of 5000 lb. Hold-down rails are provided to keep the truck from upsetting.

When a new cable needs to go in the mine, the cable truck is placed at the top of a long conveyor belt-way equipped with rope rollers. The cable truck is used to unreel the cable from the shipping reel mounted in the winding engine at the bottom of the conveyor belt-way. The cable must be wound tightly on the small drum in order to get it all on, especially when the longest cable is used. The cable must be left on the truck only long enough to transport it in the mine and place it on the hoist. To store the cable for a period of time wound tightly on the small drum would likely induce crankiness in it.

Then the cable is transported into the mine and set up for unreeling onto the hoist drum. Considerable brake pressure is applied in order to get the first wraps wound tightly on the hoist drum. This reduces creeping of the rope later when ore hoisting begins.

For placing the first cables the cable truck was set up in the drift in front of the hoist and a large fleeting sheave was provided for taking it over the front wall. Later a permanent location will be made in the old hoist room for rope changing. A sheave is provided for this in the dump and the old rope raise will be used.

Special Rollers Have Long Life

Because of the increased speed and larger rope, a new shaft roller was developed for use with the new equipment. Earlier attempts to use a rubber tread on shaft rollers were unsuccessful as the rope lubricant deteriorated the rubber and caused a deep grove to form within a short time. Present rollers are made with a synthetic rubber tread and measure 9-in. tread diam by 7½-in. tread length. The tread is held between

(*Continued on page 53*)

Motor-generator room housing hoist drive motor lies directly behind hoist room

Attracting Young Men To Coal Mining

Adherence to An Effective Program Will Bring Needed Manpower to the Industry

By K. L. KONNERTH
General Manager of Operations
H. C. Frick Coke Co.

IN the past the coal industry has done its job of supplying the nation's needs, great as they are, so well that, until comparatively recent times, the average man did not even know where coal came from. The productive activity of the bituminous coal industry can be shown by a comparison of the year 1945 with that of the year 1930. Using 1930 as 100, the index number for 1945 was, for total tons coal produced, 124; for number of men employed, 78; and for days worked, 140.

Changes in the nation's economic structure and technological development, accelerated greatly in times of war, are demanding a rapid conversion of the industry from the old pick-and-shovel concept to a highly mechanized complexity with a radical departure from generally accepted methods and practices. This necessitates the employment in coal mining, as well as industries in general, of energetic, courageous, and visionary young men to plan for the future. From the standpoint of survival as an industry, the picture is not a healthy one. The average age of employes covered by the last wage agreement is approximately 41 years. A recent limited survey of a group of mines shows 30 per cent of the employes to be in the age bracket, 50 to 65, and 18 per cent in the bracket from 18 to 30. The question, therefore, resolves itself as to what can be done to attract young men to coal mining. This is a serious problem confronting the coal mining industry—a problem that requires immediate and wholehearted attention if coal mining is to continue to be a virile and progressive industry.

We, who are part of the industry know that proper incentives are not lacking; therefore it can be assumed that our approach to the problem has been weak and our salesmanship poor. It seems impossible to present a definite and concise program with complete assurance as it is doubtful that such a solution exists. On the other hand, there is no reason for watching a now serious situation develop into a catastrophe. It is easy to adopt a negative attitude by saying that we are now reaping the harvest sown by the sins of our fathers, a harvest of distrust, distortion, and of misinformation about the conditions and opportunities in this field. Vision, courage, and sincerity of purpose must be applied so that young men looking for a field to which they may profitably devote their efforts and talents will find in the coal mining industry complete opportunity for the fulfillment of their goals.

Broadly speaking, there are three essential prerequisites to an effective program for attracting young men to coal mining: first, complete sincerity of purpose; second, an aggressive selling campaign; third, constant and determined follow-through.

A Sincere Selling Plan Needed

Despite the talk about introducing young men into jobs with coal producing companies and the serious thought given to the problem by otherwise progressive leaders, the fact remains that it is often lip service only that has been given. Apparently memories of the bad times experienced after World War I and during the depression of the early thirties have created an impression of over-abundance of coal mining labor. This condition may have existed at one time, but certainly experiences during and after World War II should have dispelled the fallacy of this conception. The older men of the hand-loading age have rendered yeoman service to the industry, and many of them have shown great adaptability in adjusting themselves to the requirements of a mechanized era; but today's demands in modern mechanical mines call for the keen insight, originality in planning, and the enthusiasm for the adoption and execution of creative ideas that the young man can supply. The balance of the two groups is needed, but for too many years only the mature judgment and experience of the "old timers" has been available. Owners and operators must recognize the need for better educated young men in managerial and supervisory capacities. This would raise the

Future mine operators in training

standards of the industry and at the same time tend to create an influx of younger men into the rank and file group.

Sound principles of salesmanship require that you first analyze the market, then analyze the product to see that it meets the requirements of the market, and finally present the product to the customer in such a manner as to create a definite desire for the product. These basic principles are certainly applicable to the problem of selling young men on the desirability of taking jobs in coal mining.

Dr. Thomas S. Baker, president of Carnegie Institute of Technology and one of the nation's foremost authorities on coal, said in 1926, "In less than a generation the present methods of shipping coal to be burned in its raw state under boilers hundreds of miles from the mines will appear to have been primitive and rudely unscientific." This statement emphasizes the unlimited possibilities for technological development in coal mining. Yet as recently as August 1946 the editors of *Industrial and Engineering Chemistry* stated, "Coal mining operations under the most favorable conditions are hazardous and highly inefficient (and) coal mining is an unpleasant, uninspiring, and none too healthy occupation."

Unfavorable Publicity Discourages Young Men

In times of crisis, wage conferences, etc., the ills of the industry are magnified out of proportion as a means to an end. Our misinformed and misguided purveyors of public information in the press, magazines, and radio depict the industry as being sick, backward, and degrading. The coal miner is referred to as a class who lives on the other side of the tracks, who ekes his questionable standard of living in an unpleasant atmosphere both in the "bowels of the earth" and in the community in which he lives. Yes, and within the industry itself the psychology of "my son will never work in the mines" is prevalent. In effect, everything possible is being done to educate our youth to stay away from the mines.

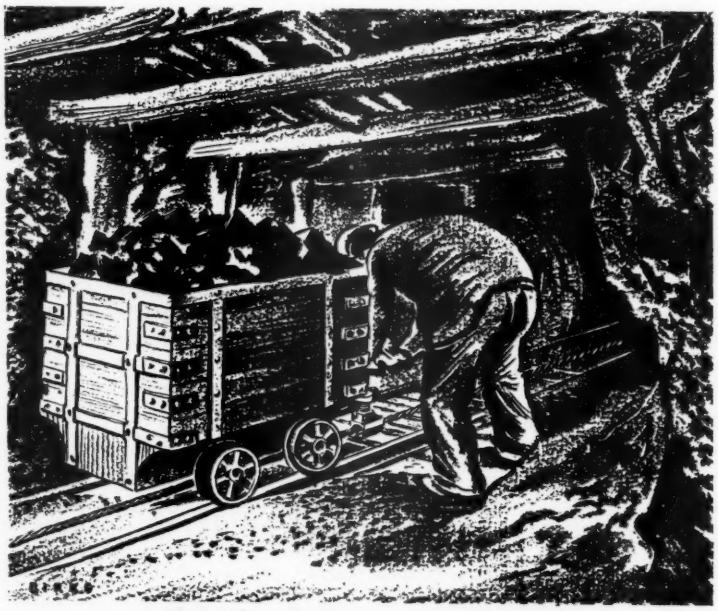
It is high time to pause and take stock of what mining men, both individually and collectively, can do to reverse this picture. Coal mining is by its very nature a young man's field. There is, perhaps, no other industry where the application of one's efforts is subject to more variation and change and where the individual's inventiveness and ingenuity are taxed to a greater degree. My own experience as an electrical engineer leads to the conclusion that no other industry offers a more interesting, broader, and more diversified application of electricity than coal mining. Similar statements can be made regarding the use of legal training, industrial relations, accounting, and even preaching.

What does the average young man expect when looking for a job? It is true that most men work for more than bread alone. Numerous surveys have been conducted among all classes of workers, and although some variations exist at different levels of intelligence and background, it is generally true that the following reasons rank high in any list of job requirements:

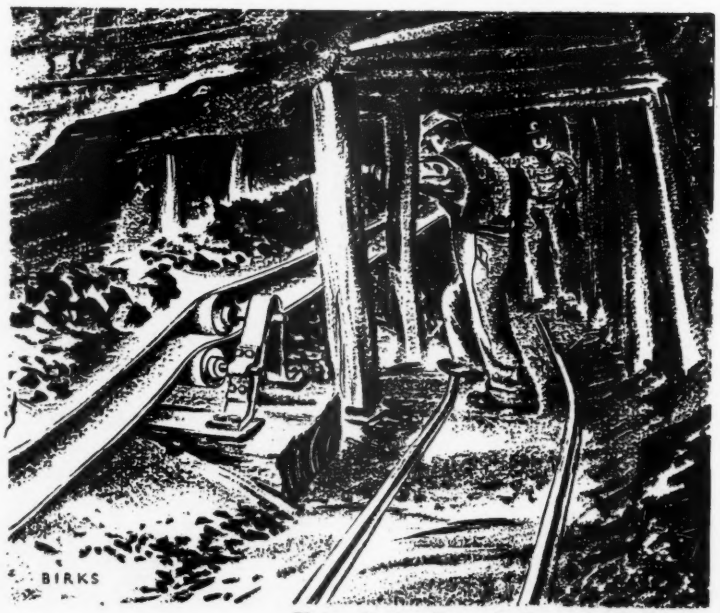
Wages or salaries
Job security
Working conditions
Relationship with associates
Supervision
Opportunity for advancement
Hours of work
Living Conditions

Coal Industry Offers Excellent Opportunities

What has the industry to offer with respect to the above? Information published by the Bureau of Labor



From arduous inconvenience to safe simplicity



Photos—Courtesy Turner Brothers Asbestos Co., Ltd.

Statistics, United States Department of Labor, shows that the earnings of bituminous workers are higher both hourly and weekly than in any of the 20 industrial groups tabulated. Coal is one of our most basic commodities, and the continuing heavy demands for it should provide job security for all qualified men. Working conditions can and should be comparable with those of any other industry. Much stress can be placed upon the uniformity of year-around temperature existing in the average coal mine. Safety is a primary consideration in the operation of all progressive mining companies. In fact the welfare of mining employes is catered to by the various agencies concerned to a much greater extent than industries in general. The trend toward mechanization in all mines offers a splendid opportunity for fostering a spirit of teamwork and cooperation among closely-knit crews of workers. The very nature of coal mining with its constantly changing conditions and problems necessitates a high degree of skill, judgment, and understanding of human nature among supervisors. Legal requirements that supervisors, at least to the level of mine foremen, must have had practical experience in the mines in addition to passing rigorous tests prescribed and conducted by the state, provide adequate opportunity for advancement to positions of responsibility for all who have the ability and initiative to better themselves. Even the proverbial banker has nothing on the present day coal miner in hours of work, namely eight hours portal to portal. Modern means of transportation make it possible for the coal miner to live in surroundings of his own choice.

Coal mining has much to offer young men. It is the coal industry's responsibility to see that they know it. This requires salesmanship of the highest order. The industry and all of us in it must work for the promotion of favorable publicity, for the inclusion of mining courses in the curriculum of vocational and high schools of our mining communities, for the dissemination of true facts about the mining industry by all available means, including personal appearances of responsible mining officials before community organizations and clubs. The offering of scholarships to accredited colleges teaching mining engineering offers a fruitful field for inducing young men of exceptional ability to turn to coal mining for their life's work. Many progressive companies are developing their own training programs, designed to give young men the basic instruction required to fit them for jobs in the many branches of the industry. It is necessary to review the various requirements of law and labor organizations so as to enhance and facilitate the entrance of young men into coal mining. The public at large must be convinced that the coal mining industry is not populated by pick-and-shovel wielding immigrants but red-blooded Americans belonging to a profession as dignified as any other and requiring the same degree of ability and intelligence.

No simple solution can be offered, but with sincerity and determination large numbers of young men can be attracted to the coal industry where the need for their services is so vital and where the opportunities for a rewarding career are so plentiful.

Industry Faces a Real Problem

If this problem is to be solved, it is not enough that we merely succeed in attracting young men to coal mining. Military history has shown repeatedly that it is easy to win a battle, even a large one, and still lose the war. Getting young men interested in jobs in our mines is admittedly a major battle, but to view the future with equanimity and assurance, it is necessary to follow-through with an equal or greater determination to live up to the expectations created. Many have experienced the deep discouragement of seeing a promising young man leave the job just when all the time and expense devoted to his training is about to pay off. At such times we all are prone to feel resentful and to charge the employe with disloyalty and lack of gratitude. Is he, however, to blame, or is it possible that we have promised too much and delivered too little? Ours is a competitive society. It is also a free society wherein each individual is at liberty to choose to work for whomever he pleases or even to refuse to work at all. Certainly it complicates our problems of industrial relations, but it also provides a high measure of personal responsibility and freedom of action, which we in this country have found good. We cannot afford complacency at any level in our industry. When we offer inducements and make promises, we must fulfill our commitments. Only by such sincerity can the battle be won.

More recital and repetition of the above mentioned facts is not sufficient. To place and keep the coal mining industry on the high level to which it is entitled requires the elimination of waste in product (both in mining and utilization), waste in manpower or time of worker, and waste in capital invested. These wastes can be eliminated through usage of a far greater percentage of better educated and trained young men. With a sincere will to do, sell, and utilize, on the part of operators and management, top-quality young men will be attracted to coal mining.

The Complete Report

OF THE

Coal Mining Convention

WILL BE PUBLISHED

IN THE JUNE ISSUE OF

MINING CONGRESS JOURNAL

Full details of a convention highlighting 25 years of Coal Mining Progress.

Watch for Your June Number.

(See Announcement on 1949 Meeting, Page 55)

Will Nuclear Energy Compete In Ten to Twenty Years?

Although coal will bear the burden of our fuel requirements for a long time to come, a possibility of generating electricity from nuclear chain reactions may be realized within a few decades

ELECTRIC power developments go hand in hand with the industrial development of the United States, the greatest electricity producer and consumer in the world. In 1909 approximately 2.9 installed horsepower were employed in industry to back up every American worker and this was principally mechanical horsepower. At present, an average 7.2 hp serves every industrial worker, and about 93 per cent of this installed horsepower is electrical power. Coal, to the extent of 86,000,000 tons, was consumed in public utility plants in 1947. For 1948, it is estimated that 93,000,000 tons will be needed. If the expected rate of growth materializes, by 1951, 112,000,000 tons annually will be required by the light and power industry. Similarly, increased amounts of coal will be needed by industrial power plants, during the coming years.

Coal producers have more than a passing interest in the development of atomic power for industry as a possible competitor at some future date. In future years more and more electric power will be needed by every industry. As present stocks of high grade iron ore become depleted, it is obvious that lower grade ores, requiring additional amounts of power for beneficiation, will be utilized. In the coal industry mines have been mechanized at a rapid rate and the power consumption per ton of coal mined is now about 6½ kw hours. But in comparison to the average worker, who is supported in his efforts by about 7.2 installed hp, the miner has an estimated 2 hp or less to assist him in his work.

Increased amounts of power will be required by the petroleum industry, the chemical industry, and for the production of aluminum and magnesium. Most of this power will be generated by coal, but atomic power for industrial use may well be available within the next decade or so. Speaking before the ASME spring meeting in New Orleans, Dr. Lyle B. Borst, chairman of the Nuclear Reactor Project at Brookhaven National Laboratory, Upton, Long Island, N. Y., said that the project hopes to demonstrate generation of power from the atom within the next two years. Dr. Borst stated "However, this demonstration will not inaugurate a new age of power generation. It will be another ten to twenty years before atomic energy can compete favorably with coal as a source of industrial power."

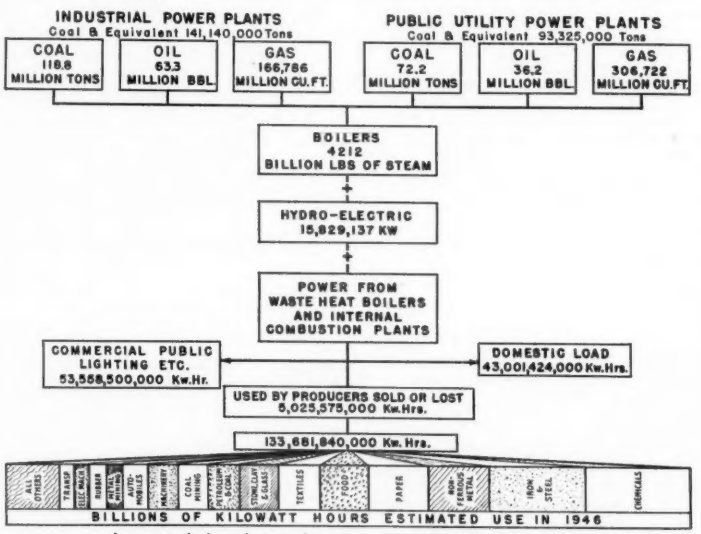
Speaking of the generation of electrical energy directly from the chain reaction, the scientist continued: "We would greatly enjoy building a chain reactor with two wires leading out to carry away the energy at a modest voltage of a million or so volts. We can get some energy from a reactor directly—in fact we normally control it by this means. Furthermore we can even visualize a system at which a reasonable efficiency can be achieved. The only trouble is that such a system will not support a chain reaction.

"So far we have learned no 'open sesame.' We acknowledge generally that electrical power, for the foreseeable future, will be generated by means of the general heat engine. Such an engine must necessarily work from a high temperature source."

Because of the excellent coal resources in the United States, Dr. Borst stated that it is quite possible that atomic power will become economically sound in other countries before it can compete with power sources here. England is directing her developments towards power to relieve her coal shortage and already has a reactor in operation from which it expects to extract electrical power on an experimental basis.

A great amount of work remains to be done before atomic energy can be released for conversion into electrical power. Shielding of the generating system poses a serious problem. Dr. J. A. Hutcheson, director, research laboratories, Westinghouse Electric Corp., points out that in addition to the problems of radiation, a means must be provided to permit continuous operation of any power—generating application by controlling the amount of fissionable material in the reactor and the means of removal of the fission products. Another engineering problem noted by Dr. Hutcheson was the requirement of suitable materials to operate at the high temperatures encountered in reactors. Development of trouble-free, remote control meth-

(*Continued on page 60*)



In several decades nuclear power may enter this picture

Morituri Te Salutamus!*

Recommendations for Revitalizing Domestic Mercury Mining

By C. N. SCHUETTE
Consulting Mining Engineer

AGAIN the quicksilver industry of the United States is on the verge of a complete shut-down. The history of this industry has often been reviewed and it is hardly necessary to do it again (see "Quicksilver," MINING CONGRESS JOURNAL, February, 1946).

Because of the present world situation the impending shut-down is worthy of note. At this time (early in April 1948) one large world source of quicksilver, the Idria Mine, is already behind the iron curtain. The Italian quicksilver mines are threatened with a similar fate. From Genoa to Barcelona is no farther than the hop from San Francisco to Los Angeles. Should the communists take Italy and the communists of Spain seize the east Spanish seaports, a concerted communist sweep would engulf the world's largest quicksilver deposits in short order. If Great Britain and France were still with us, we would have to share our little stock pile of quicksilver with them and depend on Western Hemisphere production to see us through.

Successive Wars Require More Mercury

Quicksilver needs seem to go up from war to war. In 1915-19 it was 141,500 flasks and in 1940-44 it was 223,000 flasks. In 1913, 24 of our mines were producing quicksilver and this number grew to 66 in 1916. In 1939, 107 mines were producing and this grew to 197 in 1941. At present only four mines are still producing in quantity but a further drop in price of only a few dollars will serve to close these also. Compared to former times, the "small fry" producer making a few flasks per month with retorts is practically nonexistent. Most of the mines that have been shut down for a year or more would need extensive and expensive rehabilitation to get them back into production.

In the depression years of 1930-39 the annual average price of quicksilver was a little over $84 per flask. Now, with doubled wages, lower labor efficiency, and doubled fuel and timber costs the price is only $75 per flask.

High grade ore developed by liberal spending of profits when there were profits is being worked out by the mines that are still operating. When this high grade is gone, they will shut down in poor condition to resume operation. There is no incentive for anyone to enter or to stay in the business of producing quicksilver at the present time.

Government Aid

Excessive imports of foreign metal are responsible for the low price. Mercury is produced at low cost in countries of lower living standards whose currencies are so unstable that they will sell at any price, just so it is payable in dollars. Our producers cannot compete under such conditions without some help from the Government. Such help has been sought but not granted. A parity price policy for farmers increases living costs and contributes to the manifest prosperity of the farming industry. So why not a Government policy of aid to the quicksilver industry?

The quicksilver industry is small and attempts to stop excessive imports by invoking the anti-dumping or the anti-trust laws and carrying such suits to the Supreme Court over a period of years of expensive litigation is not feasible. Tariffs do not work well when foreign currencies are unstable.

If our Government wants to keep the quicksilver industry alive, it is suggested that:

(1) Some Government agency be authorized to buy all domestic production at a fixed price of say $125 per flask for stock pile purposes.

(2) This price be guaranteed to producing mines for three years, to newly opened mines for five years, and to prospects for ten years.

During the war, New Almaden boosted production to meet unusual demands for mercury

* We who are about to die salute you.

(3) All import quicksilver be bought by the same agency at prices offered and allocated to domestic consumers unable to fill their requirements from domestic producers. Only as much quicksilver as is needed for this purpose should be imported.

This proposal would guarantee domestic producers a market for their metal at a floor price and would provide the incentive necessary to keep the industry alive. The domestic consumer would have the advantage of a stabilized market which is more important to him than a low price. Under this proposal, if competition in foreign metal offerings makes a low price, the Government agency buys at this low price and sells it at the domestic price, making a profit on the transaction. If a foreign cartel should raise the price above our floor price, the domestic price would rise with it thus stimulating our production until our requirements can be filled by our own mines, thus cutting out imports altogether. Under this proposal the Government would probably not buy much metal for the stock pile but, if the plan succeeded in establishing a flourishing quicksilver industry, a large stock pile would not be necessary.

U. S. Mines Can Supply Needs

The have-not-nation pessimists of certain Government bureaus, whose guile is apparent by the fact that they never never mention any specific price at which we are a have-not-nation in any particular metal, always complain that "no new mines are being found." Well, these same experts that were going to perform such wonders in finding ore during the war, had their chance. To cover the confusion of their pathetic failure, they, to their everlasting shame, abjectly stooped to define their results by inventing the weasel definitions of "measured," "indicated," and "inferred" ore.

After that perhaps, they will be willing to concede that mines are not found but made, though these are the same childish minds that want to squander a billion dollars over a 20-year period to make an inventory of our mineral resources. May the long suffering taxpayer be spared this final indecency.

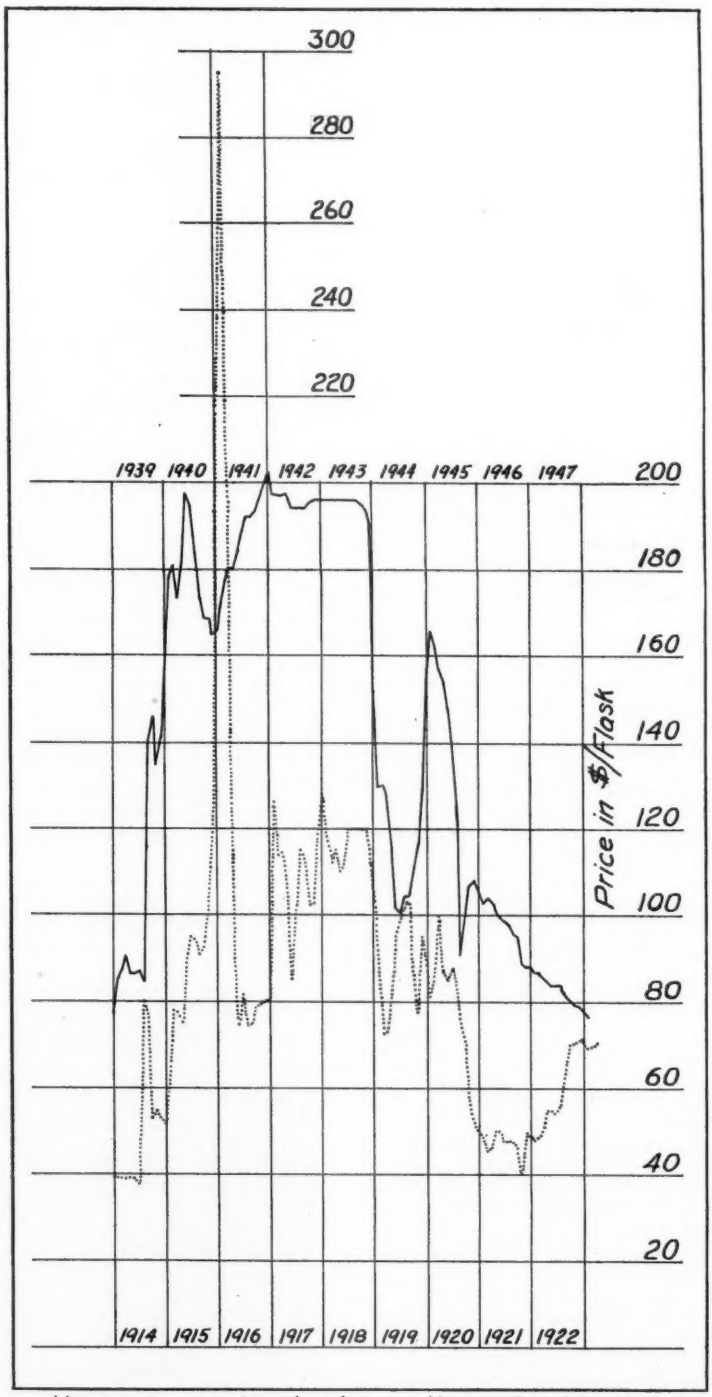
What is needed to make a domestic quicksilver industry are:

(1) Cinnabar deposits
(2) Money to work them
(3) Money must be available in a time measured by years
(4) The price outlook must be good enough to furnish an incentive.

New cinnabar occurrences are being found. In California some 300 are known. Prospecting in Oregon in recent years has found 222 of them. Nevada has 162 on record, Arkansas has 34, Texas 15, Alaska 10, and Idaho, Arizona, Utah, and Washington have productive mines as well as prospects. Cinnabar occurrences have been noted in Montana, Colorado, and New Mexico.

Money always becomes available when an increased price period seems imminent as in the case of a threatened war. The time period over which a high price will obtain is usually an unknown factor and results in the many wasteful "cut and run" practices inherent in the industry.

It is this "get in and get out quick"



Mercury price comparisons through two world wars. Dotted line shows fluctuations from 1914-22

compulsion that makes owners greedy for high royalties, stockholders greedy for dividends, and militates against conservative, long range management policies. With stabilized conditions, quicksilver mining could be an ideal "small business" operated in the traditional manner of American individual enterprise.

Price Fluctuations

Such a stabilized, healthy, small industry could be expanded in time of necessity as trained men, operating "know-how," and producing mines would be available. Stabilized price conditions are in great contrast to actual price conditions as shown on the accompanying graph.

It shows the price of quicksilver by months for the periods of World War I and World War II. The dotted line shows the price per flask of quicksilver from 1914 through 1922. The solid line gives the price per flask from 1939 through 1947. The graphs are superposed to bring out the comparison.

In the months just before World War I in 1914, the price of a flask of quicksilver was a little under $40. It doubled to $80, dropped back to $53 and then soared dizzily to $222 in January, $295 in February, and $219 in March 1916. Then it dropped back to $75. When we got into the war and through 1918 the price steadied between $100 and $120 per flask.

Imports Depress Domestic Mining

In 1918 the industry asked for tariff protection to stop the anticipated flood of foreign metal, but no such help was given until 1922 after the industry had shut down in 1921.

The imports that forced the price down to $40 in 1921 are given below and can be compared to domestic consumption as given in the second column.

Year	Imports in Flasks	Consumption in Flasks
1919	10,635	22,943
1920	14,169	26,008
1921	10,601	16,547
1922	16,920	23,004
1923	18,073	25,692
1924	13,170	23,047
1925	20,855	29,825
1926	25,976	33,502

In 1922 the tariff that was granted served to keep the industry alive but did little in stopping imports. In 1926 European producers raised prices and in 1928 they formed a cartel to control prices. This hope of a continued high price finally served to revive the domestic quicksilver industry and by 1931 it was again producing an exportable surplus.

Just before World War II the price of quicksilver was around $85 per flask. As shown on the graph, the price rose rapidly and, after we entered the war, the ceiling price provision stabilized the market near the $200 per flask mark until the end of 1943 when domestic production had climbed to 5000 flasks per month. Then the Metals Reserve Contracts were cancelled, causing the price to plunge to $100 per flask and closing many of the mines well over a year before either VE or VJ Day. The subsequent price rise to $165 in February 1945, was short lived and was based on the increased need of quicksilver for the "tropical battery." This need benefited foreign but not domestic producers.

The imports that forced the price down to $75 per flask in 1948 are given below:

Year	Imports in Flasks	Consumption in Flasks
1943	47,805	54,500
1944	19,553	42,900
1945	68,617	62,429
1946	23,062	31,200
1947	10,228	35,100

Note how the greatly increased demand for the "tropical battery" ran consumption up to 62,429 flasks in 1945. In 1943 our production had reached the rate of 60,000 flasks per year when Metals Reserve checked it because of "overproduction." Note how imports of 68,617 flasks of foreign metal took the market away from our producers in 1945. Our Government agencies controlled the situation at that time and used their powers to favor foreign producers while deliberately and unnecessarily crippling our own industry.

Getting back to the graph, note that the price of quicksilver rose from its low of $40 in 1921 to $70 in 1922, while in the corresponding years after World War II the price trend is still downwards.

This price decline of the last two years has been gradual so the remaining operating mines continued on hope and steadily but surely mined out all available ore.

The decline in price seems inexorable, and when the few remaining mines shut down they will be lacking in developed ore. During this last war the surface ores and old mine dumps were pretty well cleaned up so that this reserve of quickly available low grade material is gone.

What the industry needs for revival is hard, honest, long-term underground exploration and development. With present high costs and scarcity of labor this will be expensive. Only a strong incentive will serve to induce anyone to venture such work.

If we are serious in wanting the United States to be in a state of preparedness for war, the small but important quicksilver industry warrants a bit of attention at this time. It is skating on exceedingly thin ice.

Women helped sort Almaden's war-time production

Diamond drilling for mercury with a woman helper

Rubber-tired Versus Crawler-type Bulldozers—

To the spoil bank with a good load

West Virginia Stripping Operation Tests Relative Efficiency

★

By RAY E. MORGAN
Head, Department of Mining and Geology
West Virginia Institute of Technology

★

Rubber-tired dozers do not injure coal. Note rooter at work

ABOUT two miles to the east of Sewell, W. Va., and some 1400 ft above the town, lies a deposit of Sewell coal which ranks first in available tonnage and economic importance among the 20 separate minable beds in Fayette County. The Sewell Seam, which at this locality measures 42 in., has been mined on a commercial scale for a long time and it is reported to have been coked at the Sewell ovens as early as 1870. The light gray coke is in great demand for metallurgical use. Usually only the slack of finer sizes are ground for the coke oven charge as the coal is excellent for steam and domestic fuel. Most of the larger size coal is shipped out on the Chesapeake and Ohio Railway. From the finer sizes, about 160 tons of coke per day is produced from 193 open-top ovens. The following is an average analysis of Sewell coal from the area:

	Per cent
Moisture	0.72
Volatile matter	20.45
Fixed carbon	75.31
Ash	3.52
Total	100.00
Sulphur	0.80
Phosphorus	0.007
Btu.	15,138

When the present owners of the 29-acre Sewell coal outcrop, the Babcock Coal and Coke Co., decided to strip and recover the coal, the contract to put the coal in the tipple was let to Rollin A. Hawkins of Charleston, W. Va. It was up to Hawkins and his crew of workers to doze out 2¾ miles of access road to the stripping operation. The road was on a plateau over comparatively easy grade. Slightly more than 2¼ miles of haulage road was constructed to the tipple at Sewell with grades as high as eight per cent. Anticipated expense in building this section of the road was one of the major considerations for not stripping this deposit prior to

the present date. Road cost estimates, to date, are $3000 for construction and $3000 for maintenance.

Of the 29 acres, about nine acres have already been stripped. The coal averages 42-in. in thickness, excluding a non-persistent 10-in. rider, which is of good quality where present, but too thin to recover. An estimated total of about 180,000 tons of commercial and recoverable coal was originally present. At current market prices for Sewell coal ($5.50 to $5.75) this coal would be worth about $1,000,000 in the tipple. As indicated on the map, the coal at this place has a pronounced westerly dip equivalent to a grade of nine to ten per cent with occasional small rolls.

Wheeled Dozers Speed the Work

Although the overburden varies from a maximum of about 40 ft to a minimum approaching zero feet, the average is about 18 ft, giving a 5 to 1 ratio of overburden to coal. As indicated by the topographic map the outcrop line is near the top of a hill. Location of spoil banks is, therefore, no special problem and there has been no necessity of recasting or handling overburden more than once. All the dirt has been pushed to the spoil banks by two Turnadozers and an International tractor.

Even though the present cost of a Turnadozer is about twice the cost of a crawler-type unit of the same rated pay load capacity, there is every indication that their operation may prove to be more economical because of their greater speed. Wheeled dozers are much faster on turnaround or when backing up to take another bite and they push a payload at least as fast as the crawler-type dozer. Moreover, major replacement parts are less expensive; tires cost less than tracks and last longer. When a dozer is used to blade the last dirt off the coal surface, tires do less damage to the coal than do crawler tracks. For the same reason, it is possible to secure permission for a rubber-tired vehicle to move on state roads from one job to another under its own power.

It is possible to throw the Turnadozer into reverse and start moving backward with no perceptible pause between rapid forward and rapid backward motion. This throws a tremendous thrust on the final drive pinion. There have been two temporary breakdowns because of failure of the final drive pinion, but LeTourneau engineers and mechanics are working to correct this condition.

No shooting is required to break up the upper part of the overburden before it can be dozed to the spoil bank. However, some areas are consolidated enough to require loosening with a rooter which is pulled by one of the bulldozers. When the rooter is in forward motion all its weight is thrown on its single tooth to bury it about 2 ft in the ground.

Self-Propelled Unit Drills Shot Holes in High Wall

Overlying the Sewell coal is a capping of seven to ten feet of hard roof slate which in places is overlain by the rider of 10 in. coal. This slate or hard carbonaceous shale must be shot before the coal can be uncovered. Horizontal six inch holes are drilled 50 ft into the high wall about two feet above the Sewell coal, with a McCarthy self-propelled auger drill using detachable bits. The holes are loaded with Redcross Extra 40 per cent ammonia dynamite in 4½ in. diam cartridges, 22 in. long, weighing about 15 lb. Charges of 150 lb are loaded in each hole with air decking or air space between the charge and the stemming. The charges are fired with primacord detonating fuse. About three cubic yards of rock are broken per pound of explosive.

Vertical Drill Facilitates Shooting of Coal

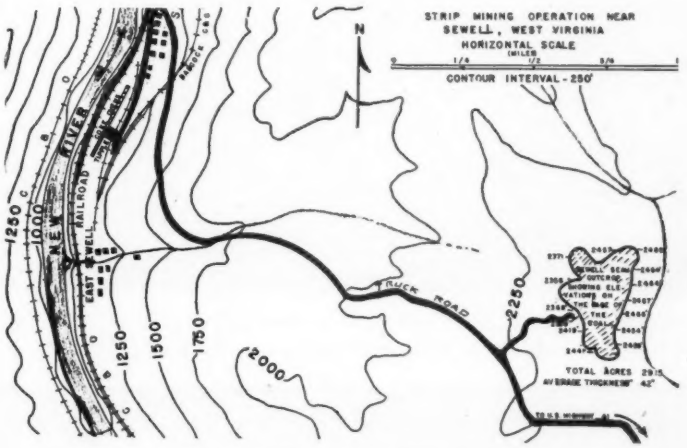
After the coal surface has been cleaned of overburden it is broken up for the loading shovel by a self-propelled Hardsocq vertical drill. Vertical holes are drilled with auger bits to within two or three in. of the bottom of the coal and shot with a mild explosive. Using self-propelled drills saves the labor of "barring over" equipment by hand, or of having a truck and driver standing by to pull the drill to a new location.

After a Koehring ½-yd shovel loads them, the three White trucks and three International trucks transport coal to the tipple. The trucks have 138 hp gasoline motors and are rated at 11-yd capacity. The average run to the tipple is over 2½ miles. The pay load is carried mostly down hill.

In addition to field superintendent, Ralph R. Price, an average crew of about 15 men are employed for one eight-hour shift per day. These include one shovel operator, three dozer operators, one mechanic, six truck drivers, one grader operator, and two laborers.

After all the unconsolidated overburden has been removed, stripping of overburden will be continued with a Lorain two-yard standard power shovel which will load into two rubber-tired Turnawagons. As the highwall retreats from the spoil bank, in some cases necessitating an upgrade payload haul because of the dip of the coal seam, the Turnawagons should carry overburden more efficiently than the dozers can push it.

Under the present setup, an average of about 8000 tons of coal per month is being placed in the tipple.



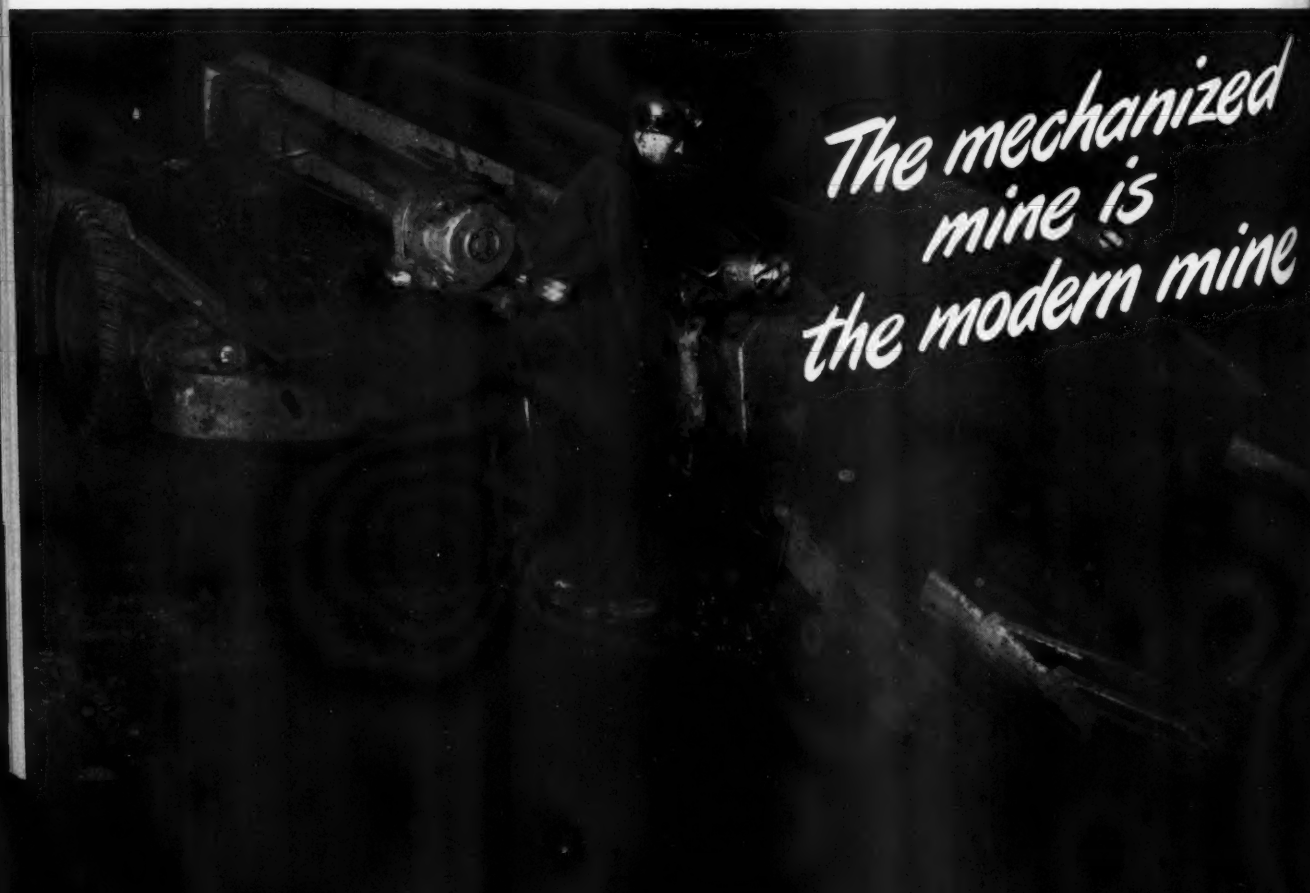
Grade favors loaded trucks

With the advent of summer weather and better road conditions, two more trucks will be added to the six now in use for coal haulage. A larger shovel, now being used on the road, will replace the ½-yd shovel for loading coal. A 50-hr work week is planned to speed up production. Flood lights for night work will be rigged up and, with other modifications, coal delivery at the tipple may rise to 16,000 tons per month provided that sufficient railroad cars are available. At anticipated peak production the remaining coal may be stripped in eight months.

JOY loads and

The business end of the Joy 18-HR goes to work in the muck—digs deep—loads the iron ore fast!

Operational control is highly simplified—protected position of operator and ease of handling is apparent.



The mechanized mine is the modern mine

handles iron ore

JOY Loaders, Shuttle Cars and Conveyors do an outstanding job in loading and moving iron ore faster, and at less cost per ton

JOY mechanized equipment is built for heavy, hard duty... low maintenance... long life... *faster handling.*

Joy 60-E Shuttle Car—easily handled, safe, strong and low in maintenance.

Joy Elevator Conveyor receiving load of iron ore from shuttle car for redumping into mine cars.

JOY MANUFACTURING COMPANY
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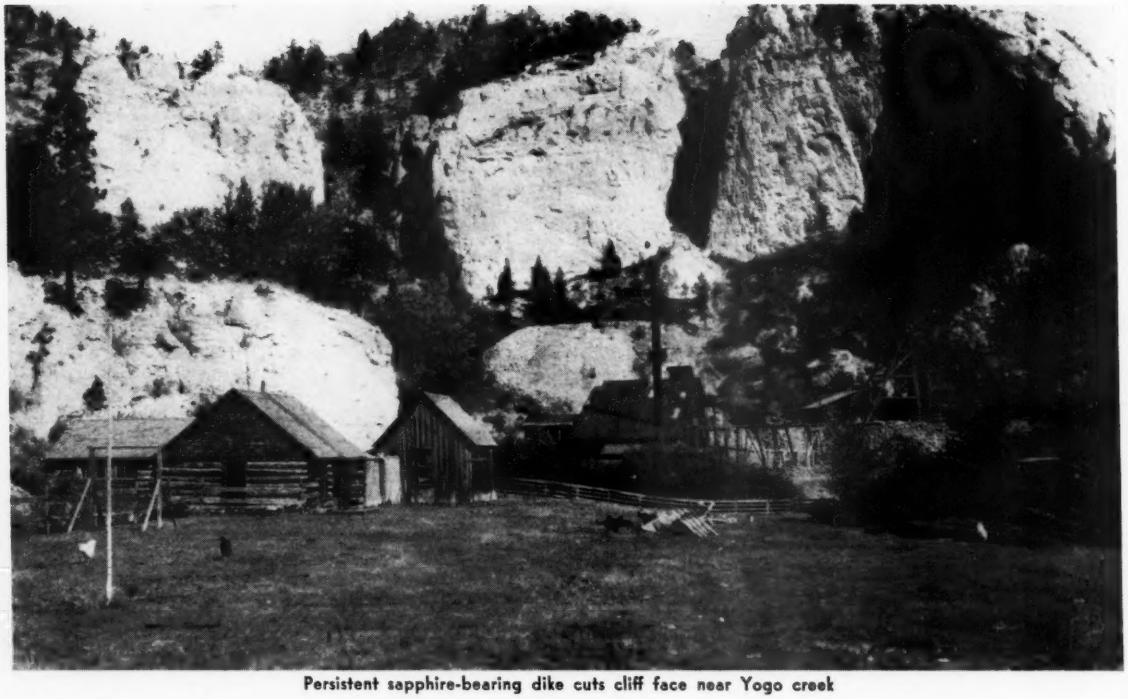
Consult a Joy Engineer



Persistent sapphire-bearing dike cuts cliff face near Yogo creek

Can Sapphire Mining Revive?

FAITH in the possibilities of prospects becoming bonanzas is deep-rooted among their owners. More often than not, the pay dirt just isn't there, but when it does exist and lack of capital or an uncertain market are the drawbacks to operating, the owner's burden is doubly heavy.

When synthetic sapphires demonstrated their ability to serve industry and, except for observers equipped with microscopes, were indistinguishable from genuine stones, the sapphire market nose-dived. Prices remained low for a year or two but bounded back to a new high. About 1923 synthetic stones began to appear in ring settings and in 1947 the star sapphire was produced synthetically. Despite this competition, the market is good for genuine gem sapphires with their rarity and beauty.

The supply of genuine gem sapphires, although a bit short, might be met by gem stone production from domestic mines. But as the production of most domestic mines was primarily of industrial quality sapphire, it is doubtful if profitable operations, dependent upon gem stone production, could be revived.

For about three decades following 1898, sapphire mining was active in Montana and gem sapphires from Montana mines graced the hands and

Synthetic Stones Stiffly Compete with Genuine Gems

throats of the ladies who dominated the salons during the first quarter of the century. Originally thought to be rounded fragments of whiskey bottles, the pebbles found by early prospectors along Yogo Creek were later identified as sapphires.

An English syndicate and an American company operated the mines and in 1914 the English group acquired complete control. On limited capital and with only slight attention to publicity and marketing, the English group managed to sell an average $80,000 worth of stones per year over the 30 years of production.

Within a year after the recession of 1924, the market for genuine sapphires slumped and by 1926 the mines which had given fame to Montana as a source of the blue gem ceased operations.

Only one of the original group of

First worked as an open cut, mining operations were continued underground

English owners remains active and for 20 years he has doggedly clung to the hope of revival of the "diggings." The small stock of stones that were on hand when operations terminated has been sold. A weathered stockpile of sapphire-bearing rock lies in the shadow of the pipe-line that once carried the water for washing the ore.

An indeterminate market with stiff competition from synthetic stones makes the hope slim for the economic production of natural sapphire for industrial purposes. The domestic gem stone market is about $100,000,000 annually with 95 per cent of this sum spent on diamonds. Rubies and sapphires account for about $1,000,000 per year. A portion of this market might be captured by a well-financed organization that would carry on a forceful publicity campaign to dispose of their product. But gem stone deposits are not easily sampled and their valuation lies largely in the realm of guess work. Large samples in ton-size lots must be washed in order to arrive at a fair knowledge of the total sapphire content of a dike.

Specimens of the Yogo sapphires may be seen in several museums and many experts are familiar with the stones that originated from the hills of Judith Basin. But whether or not profitable operations of domestic sapphire mines can be resumed depends largely upon whether or not the gem stone content of the dirt is sufficient, aside from the industrial sapphire content, to pay costs and leave a profit.

Sluicing into the riffles and the cleanup. These are scenes of more than 30 years ago

Power Distribution Specifications

Rugged Construction and Adequate Capacity and Safeguards Are Essential.

By L. D. SINIFF
Mechanical and Electrical Engineer
Consolidation Coal Co. (Ky.)

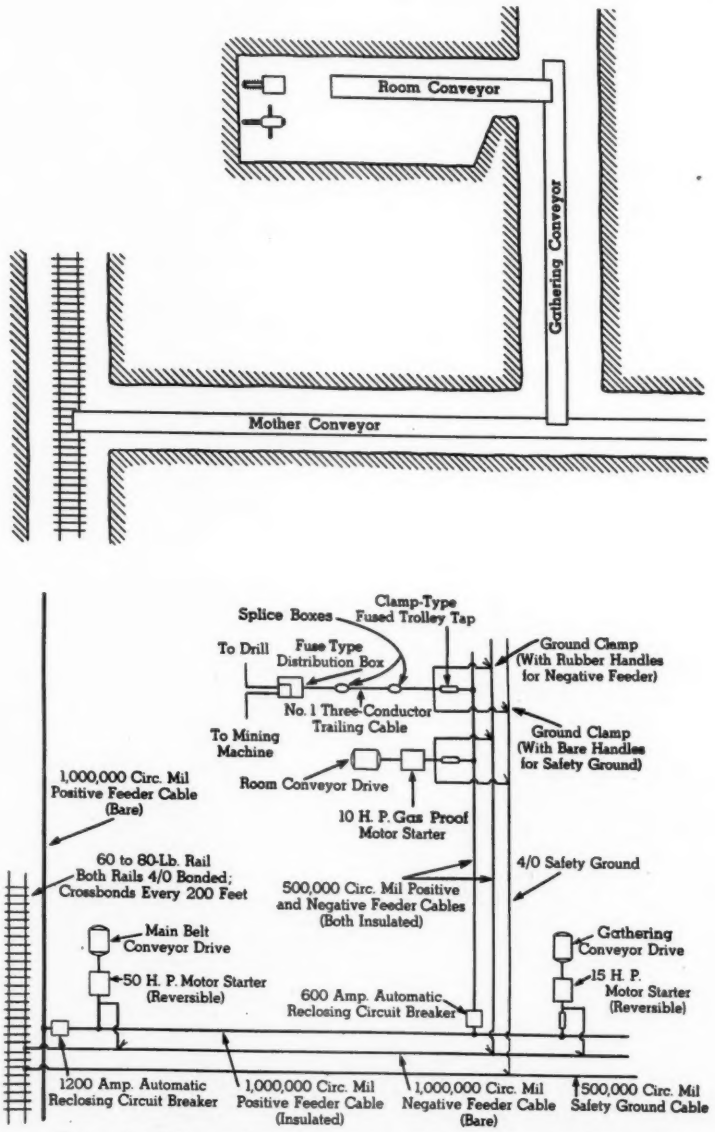
TO be satisfactory, a good underground power distribution system for mechanical mining must meet five important points. Adequate power must be supplied; the system must properly protect itself and the equipment it serves; it must be capable of being moved with minimum delay and expense; be safe and convenient for the workers; and must operate without interruption within itself and with minimum maintenance.

Any system is required to be able to furnish sufficient power without heating and to maintain good voltage so that the equipment it serves will not be affected. It is assumed that the power at the point of take-off of any mechanical section is good, because it is a foregone conclusion that mechanical mining cannot afford to be penalized by poor power.

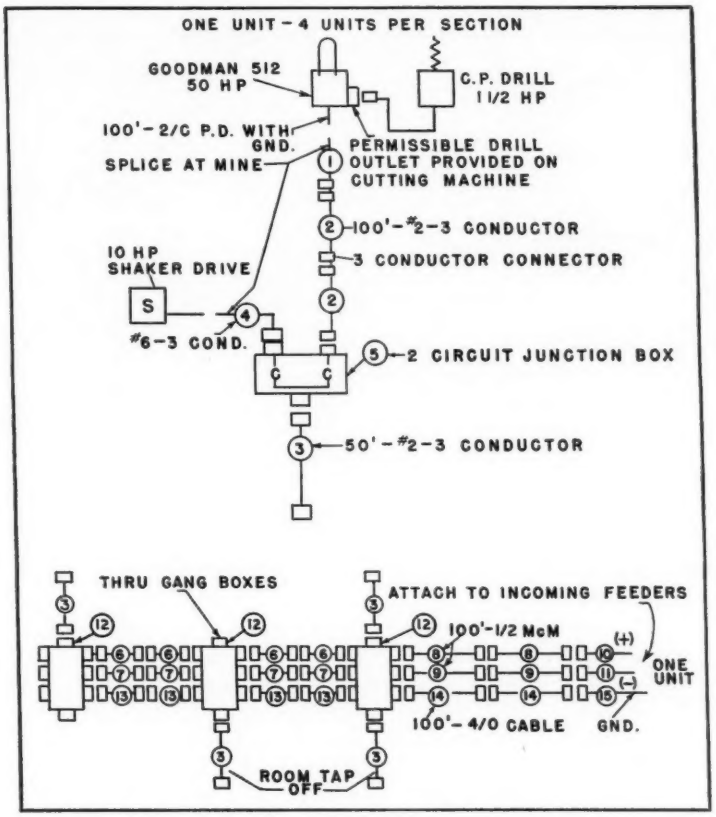
Conductors used in the system should be of a size determined by the amount of equipment used and the distance the equipment is from the point of take-off. A voltage of 550 is preferred by many operators for distribution systems because of the smaller size conductors required. Space does not permit a discussion of numerous other advantages and disadvantages.

The second requirement is the proper protection of the system to insure against the hazards of fire, overloads, short circuits or faults in the equipment served. Protection must likewise be given to all persons operating the equipment. Although the Federal Code requires a frame ground throughout the system, the recent recommendation of the Underground Power Committee of the American Mining Congress has been that the frame ground is not necessary where a circuit breaker is used that opens all three conductors when a ground fault tripping device is used.

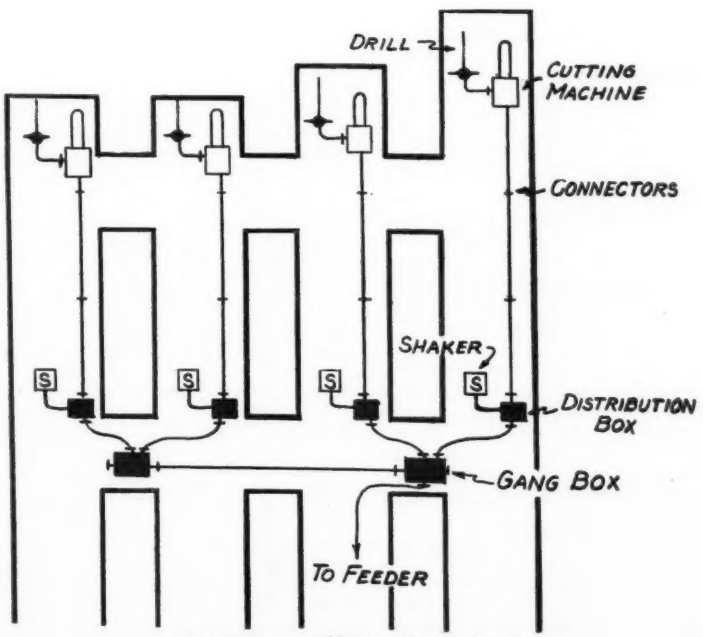
At the point of take off from the regular power system, provision should be made for disconnecting the power, followed by a fuse or circuit breaker, either manual or automatic, to control the amount of power that can be fed into the section. If it is necessary to have power on the section when it is not working, say for the purpose of operating a pump, a reduction of power can be accom-


Room Conveyor
Gathering Conveyor
Mother Conveyor
Splice Boxes
Clamp-Type Fused Trolley Tap
To Drill
Fuse Type Distribution Box
Ground Clamp (With Rubber Handles for Negative Feeder)
No. 1 Three-Conductor Trailing Cable
To Mining Machine
Ground Clamp (With Bare Handles for Safety Ground)
1,000,000 Circ. Mil Positive Feeder Cable (Bare)
Room Conveyor Drive
10 H. P. Gas Proof Motor Starter
60 to 80-Lb. Rail Both Rails 4/0 Bonded; Crossbonds Every 200 Feet
4/0 Safety Ground
500,000 Circ. Mil Positive and Negative Feeder Cables (Both Insulated)
Main Belt Conveyor Drive
Gathering Conveyor Drive
50 H. P. Motor Starter (Reversible)
600 Amp. Automatic Reclosing Circuit Breaker
15 H. P. Motor Starter (Reversible)
1200 Amp. Automatic Reclosing Circuit Breaker
1,000,000 Circ. Mil Positive Feeder Cable (Insulated)
1,000,000 Circ. Mil Negative Feeder Cable (Bare)
500,000 Circ. Mil Safety Ground Cable

Power distribution system for conveyor mining panel as illustrated above



Complete equipment for power distribution for a shaker conveyor operation in a four-room panel



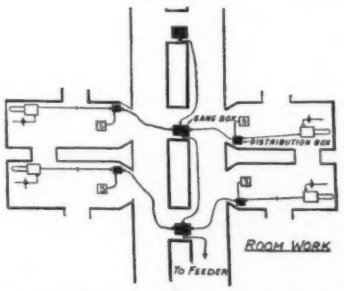
Equipment assembled to develop four entries

plished by installing a by-pass, fused safety switch or having a dual-setting, overload relay on the automatic breaker.

Each branch circuit going to the equipment on the section must be protected by a fuse or circuit breaker.

Moving the Distribution System

As a third required point, the power system should be capable of being moved easily, as the section advances or retreats, with the shortest possible delays and with a minimum of expense. In fact, the interruption of power should never be the limiting part of any move because, with a bit of foresight and planning the system can be readily dissembled and conveniently moved into the new set up. Sufficient extra component parts should be available so that a maximum of the preliminary work can be done before the move is started. This will encourage the increased efficiency that results from moving the section at the proper time rather than an enforced



Equipment assembled to work two rooms off each side of entry

waiting for an idle day or week end.

In order to break the power system into parts that can be readily handled, the connections should be of such nature that they can easily be taken apart and easily reassembled. There are a number of single and multiple conductor connectors available that have good electrical and mechanical records where they have been used. One advantage of having the cables made up in sections with connectors is the reduction of surplus cable on a new set up. Sectional cables make it possible to add additional lengths of cable as the mining advances. It is questionable if heavy explosion tested boxes are needed for this purpose, as good connectors of proper electrical and mechanical design should be as safe as the cable itself.

Distribution and junction boxes capable of handling one to four circuits are available in either permissible or open-type design. Some use fuses but others incorporate circuit breakers. Most of the boxes are equipped with interlocking connections so the cables can be discon-

nected for ease of moving or shifting the cable from one box to another. The location of the box determines whether it must be permissible, however, the number of pieces of equipment each box serves determines the size. The maintenance of these units varies widely throughout the industry.

By using distribution boxes and mechanical connectors, it is possible to keep the time and labor required to move to a minimum.

Safety and Convenience

The fourth requirement and one of the most important is safety and convenience for the worker. The safety afforded in a system is often bypassed because it is inconvenient to the worker. Frequently an oversize fuse or a substitute, such as wire is installed in place of the proper fuse because of the difficulty of reaching it when it blows. Circuit breakers and the boxes containing them are often damaged when the breaker trips too easily. Careful thought should be given to the location of the protective equipment when laying out the system so it will be convenient for the worker in case of an operation of the device. No one can blame a man for becoming disgusted if he has to crawl a long distance to replace a fuse or reset the breaker when it could have been arranged to have it located near him or located where a fellow worker could take care of it when necessary.

All men in the section should be made familiar with the power layout and stress should be laid on the features incorporated for safety. Education on these points will go a long way in keeping the system properly maintained.

As last among the important points that should be incorporated in any power distribution system is that it must function without interruption, with little maintenance, and a minimum of inspection. Everyone is familiar with the rough handling to which equipment in coal mines is subjected, hence all cables and their connectors, distribution boxes and their contents, and the levers on the outside must be able to "take it."

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1948

COAL MINE

MODERNIZATION

YEARBOOK

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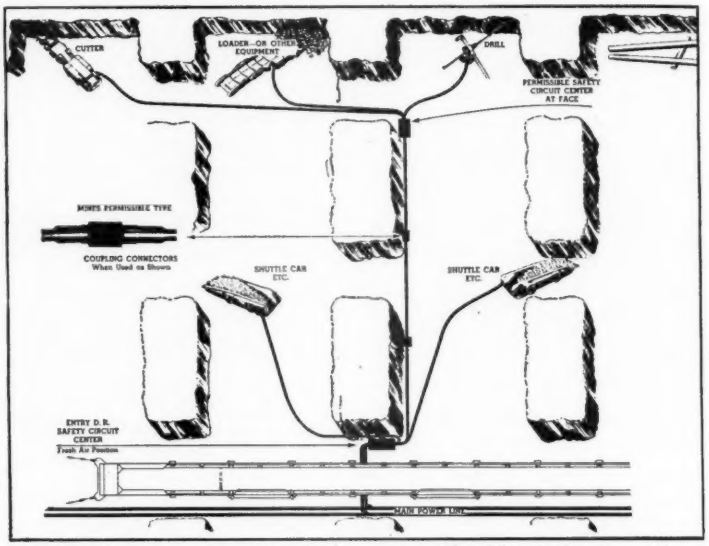
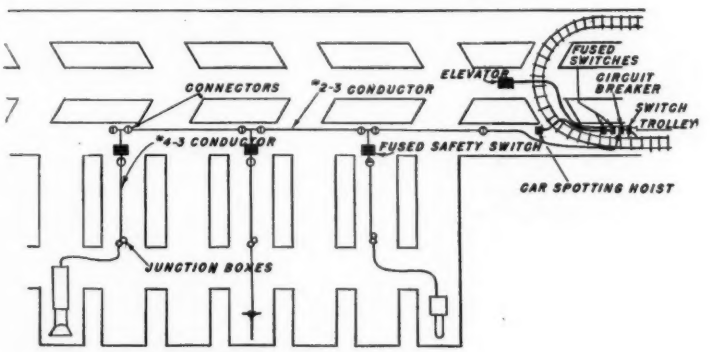
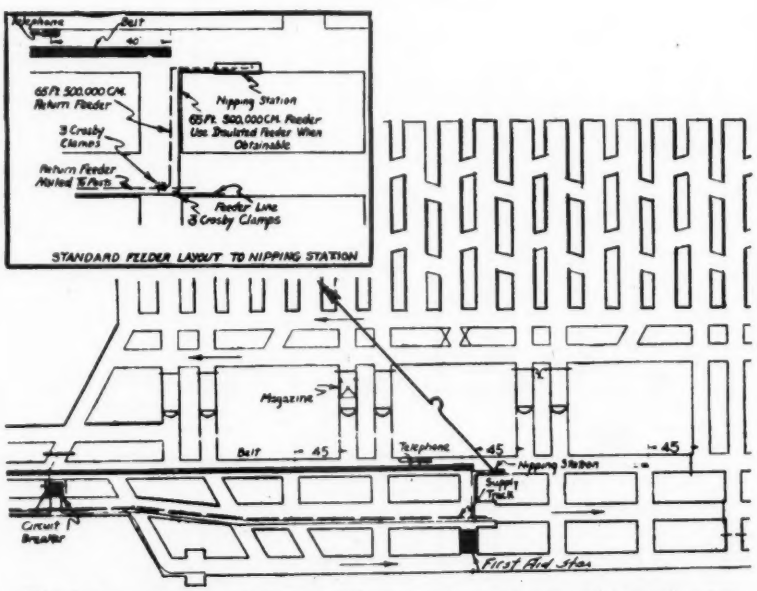


Distribution system for tractor loader system with rubber-tired cutter and battery shuttles to mine car trip





Distribution system for panel illustrated above. Tractor loader, rubber-tired cutter and cable reel shuttles to belt conveyor

Meteor Crater—A Source of Quality Silica

Sand Pulverized by Meteor's Impact Is Mined for Commercial Use

METEOR Crater, 19 miles from Winslow in northern Arizona, once again is the scene of mining endeavor, but this time no efforts are being made to settle the old argument as to the origin of the crater, or to locate the heavenly body which many believe buried itself there as long ago as 50,000 years. The interest of the new operators is in the almost pure silica sands which cover an area of approximately two square miles and are known to extend to a depth of 700 ft.

All mining is done from the surface by means of draglines. The product requires no grinding, merely preliminary disintegration, drying, and air separation. Disintegration is accomplished with a small crusher, and separation by the Marvin process, designed by O. F. Marvin of Clemenceau, Ariz. The plant is said to be the only one of its type in the United States. Although the shipments are made principally in bulk, in sealed box cars, the plant does have a bag house and sacking equipment. The company has constructed its own ramp and railroad spur extending from Sunshine on the Santa Fe railroad to the separation plant on the south rim of the crater.

Extensive testing indicates that the sands are particularly well-adapted to precision foundry operations, and also are suitable for glass (including plate glass), ceramics, and glazing. All shipments are classified to meet the specific requirements of purchasers. The foundry sands run from 30 mesh to 100 mesh with not more than 10 per cent minus 100.

Traveling bagger sacks silica for shipment

Large Reserves Are Unusually Pure

The sand deposit is said to be pure from within one foot of the surface and to continue almost without change to the bottom of the 700-ft shaft. Company engineers, therefore, estimate that the quantity of commercial sands is inexhaustible, or at least sufficient for any type of operation for several generations.

Although the first foot from the surface contains wind-blown silt, and some vegetable matter, when these are removed the sand is of the same

analysis as at shallow depths with the exception of a few fragments of limestone apparently distributed by the elements through the years from a near-by limestone area. So far as has been determined there are no clay binders in the sand, and no refractory or injurious metals or substances. An average analysis shows: 99.29 per cent silica; 0.41 per cent aluminum; and only 0.029 per cent iron.

In its natural state the sand is almost pure white and runs from 30 mesh down to minus 325 mesh. The sand crystals are smooth with no tendency to sharpness. As to size of grains, an average sample shows 11.45 per cent through 325 mesh, 5.5 on 325 mesh, 10.7 per cent on 200 mesh and 72.35 on 100 mesh.

Within a short time, Meteor Silica expects to produce a product for use on the West Coast of approximately 85 per cent minus 200 mesh and hopes at that time to be able to extract all sand of minus 300 mesh, thus creating an extremely fine product.

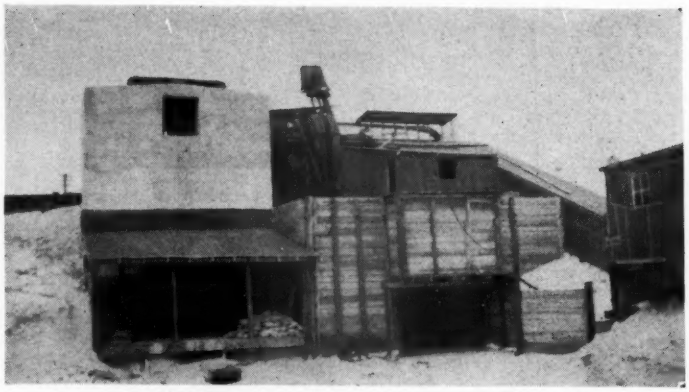
Meteor Crater is owned by the Standard Iron Co. of Pittsburgh, Pa. Work is conducted on a royalty basis, which does not cover any rights in the meteor formation. The present organization is Meteor Silica Corp., headed by W. A. Moeur, president, of Phoenix. He and his four associates became interested in the project about a year and a half ago and since then have been engaged in testing the sands for industrial purposes and in perfecting the method of treatment so as to provide a product suitable to the trade. Recently, a pilot plant with a rated capacity of 20 tons per hr was completed and the property placed on a production basis.

E. E. Pomeroy of Winslow, Ariz., is in direct charge of mining and separation operations.

Drilling Located Meteor Fragments

The first exploration at Meteor Crater was undertaken some 40 years ago in an effort to locate the main body of the meteor. According to rumor it was located some 1500 ft from the surface, the discovery having been made by drilling. Later, a double-compartment shaft was sunk to a depth of 700 ft, but water was encountered in considerable quantity at about 650 ft. Pumping was not satisfactory, due to the abrasive character of the free sands at the bottom of the shaft, and being unable to obtain suitable equipment, the project was abandoned.

In 1930 a geophysical examination was made, which consisted of complete geological, magnetic, and electrical surveys, together with asociated laboratory studies. As a result of this survey it was recommended that drill hole exploration be undertaken in five locations, so placed as to effectively determine the commercial value of the deposit. The first hole, placed in the center of the favorable area indicated by the geophysical survey, ran into the zone containing meteoric fragments at a depth of 414 ft. Below that depth for a distance of 261 ft the drill hit meteoric fragments at frequent intervals, until at 675 ft further progress was halted as the drill became lodged in the upper portion of the more concentrated meteoric zone. It was necessary to employ special alloy bits in the rotary tools because of the extreme hardness of the meteoric fragments which caused nicking and rapid wear of the bit. Similar results were obtained in a second drill hole. With the difficult depression days, and the coming of war, further exploration had to be abandoned. But the results obtained were believed to vindicate the faith shown by the late D. M. Barringer, G. M. Colvocoresses, and their associates in the existence of a mass of meteoric material, and to have added important data bearing on the solution of the question as to the origin of Meteor Crater—a subject of endless controversy among astronomers, geologists, and other scientists.

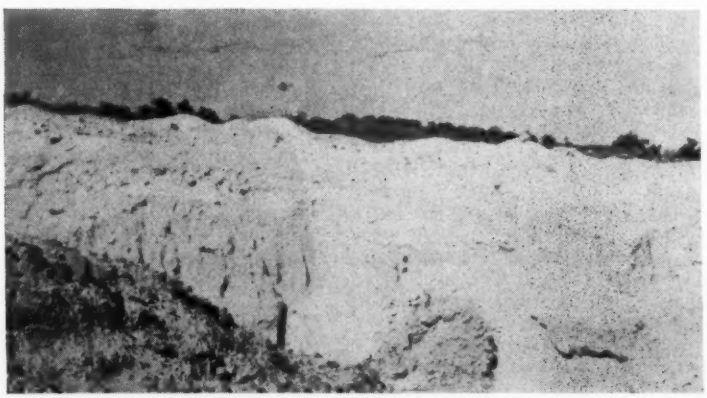


Pilot-plant tests will govern later construction

Meteor Crater, itself, is nearly circular, the diameter at the rim being about 4000 ft. The bottom is nearly 600 ft below the highest point of the rim, which rises 150 ft above the level of the outer plain. It has been known to the Indians of the region for many hundreds of years, and meteoric fragments, as well as the white sands, have been used in their religious ceremonies. According to the Indian legend, it was formed by a wicked god who was cast out of the Heavens and fell to earth in flames, digging the great hole and burying himself under the sands at its bottom.

Thousands of specimens of meteorites, weighing up to a maximum of 1400 lb, have been found in the vicinity. They are said to contain on an average about 90 per cent iron with a substantial quantity of nickel and relatively small quantities of platinum and iridium. Gold and microscopic diamonds have been detected in some, but no radium has been found.

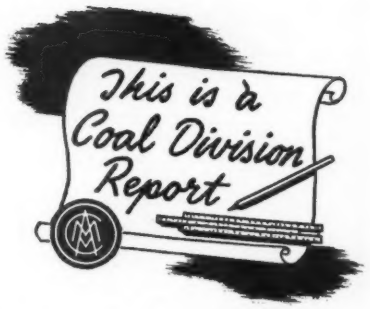
All previous work at the crater has been directed toward the location and mining of this meteoric material, but Meteor Silica Corp., working on the south rim, is putting to commercial use the rock flour believed to have been created by the impact with which this giant meteor struck the earth.



Silica sand is exposed after stripping shallow overburden

Pillar Recovery Under Adverse Roof Conditions

A Joint Report by the Mechanical Loading Committee and the Roof Action Committee



THE two reports presented here complete that phase of the joint study being made by the Mechanical Loading Committee and the Roof Committee, which deals with pillar recovery under different types of roof conditions. A preliminary report published in the March 1947 MINING CONGRESS JOURNAL discussed the effect of mine roof on the possible percentage of pillar extraction and although the committees recognized that coal seams occur in a wide variety of physical conditions, and that there is no distinct line of demarcation between these varieties, it was felt that, for the purpose of this study, mine roofs could be divided into four general classes. These are as follows: (1) very strong roof; (2) medium strong roof; (3) medium weak roof, and (4) very weak roof.

Reports on the first two classifications have already been published in the September 1947 MINING CONGRESS JOURNAL and the reports presented here cover the last two classifications as listed above. At the Annual Conference of the Coal Division in Pittsburgh last November 18, these were read and discussed; this discussion was largely confined to the points covered, but as no disagreement was brought out, the reports were approved by the committee.

It is of course realized that any method of pillar extraction, as well as the percentage of coal which can be recovered economically, is dependent on several factors. Probably the greatest determining factor is the character of the mine roof. As experience has repeatedly shown, the most successful pillar operations are those where the plans were formed after a study was made of how the roof will act. In other words, the best way is to let the pillar recovery plan be dictated by the roof condition, rather than to reverse this and attempt to make the roof action conform to some predetermined plan of extraction or timbering. Much time, effort, and money has been wasted in futile attempts to "control" the roof.

As outlined above, the committee made four general classifications of mine roof, and as described in this article, the lower limit of weak roof has not yet been successfully pillar mined. It is also true that at the other end of the scale—strong roof—pillar recovery has not been successfully practiced. In mines where the top or the rock in close proximity to the top is so strong that it will neither break or bend, as far as the knowledge of the committee goes, the customary mining plan has been similar in principle to that described for very weak roof—to make a fairly high percentage of extraction on the first and only mining, but to leave sufficient solid coal in place to support the overlying strata without squeezes or creeps. Fortunately, most coal seams occur between these two sets of extreme roof conditions, and in the opinion of the committee, a majority of the coal mines now in operation can use some form of pillar extraction.

PILLAR MINING UNDER MEDIUM WEAK ROOF

By D. C. Ridenour
Committee on Mechanical Loading

MECHANICAL mining in the Pittsburgh seam, operating under drawslate and without cleaning facilities, is being made possible by the use of crawler-type loaders and rubber-tired shuttle cars. Two different mines using the same equipment in the same seam arrived at entirely opposite conclusions as to the adaptability of this type of operation to their natural conditions.

Difficult Roof Conditions

At Mine A, the coal is overlaid with drawslate that varies in thickness from a few inches to six ft and in hardness from a fairly firm shale to a shale containing slips of soft mud. Above the drawslate are four to five ft of roof coal and slate, some of which makes a good roof. These thinner layers of slate and roof coal are overlaid with a strong, heavy shale which can only be broken if the coal is fully extracted. The coal seam is 5 ft-7 in. thick including 5½ in. of slate bands, a bearing-in band, and bottom coal. The coal seam is underlaid by a hard fireclay that makes a satisfactory road bed for shuttle-car haulage so long as it is not permitted to get wet; small quantities of water quickly soften the clay and make the roadway impassable for rubber tires.

Room and Pillar System

In order to load a maximum amount of coal, the rooms were driven 24 ft wide to provide 34 tons of coal per cut. Since crossbars of such length would not have sufficient strength to support the slate, the roof span was cut in half by setting a line of center posts as shown in Fig. 1-A and using crossbars 12 ft long. In the mining operation, one-half of the room was worked at a time. The machine first cut the right side of the face, then traveled to the left side, going around the center line of posts by way of the tramming breakthrough and sumping in again to finish cutting the remaining half. The entire cut was drilled and the right half of the face shot down. The left half was shot after the right half was loaded out and the slate posted with not less than four steel jacks. In this way, the slate was left unsupported for the least possible amount of time. The remaining four jacks were set as loading progressed across the face. The timbering plan

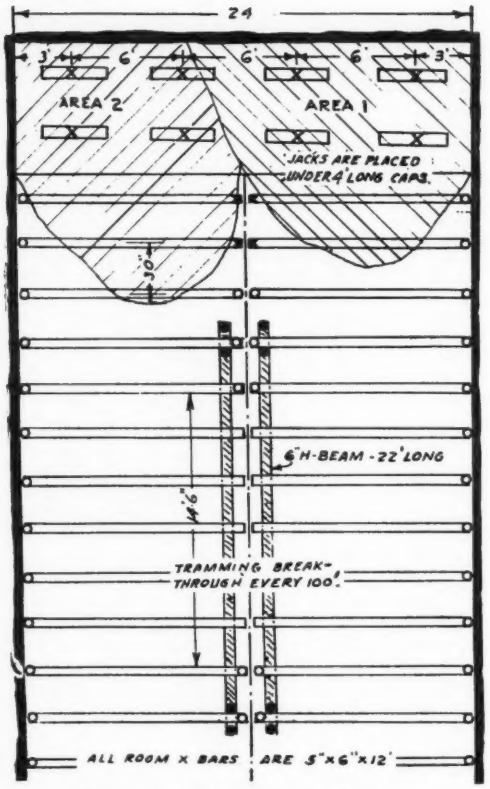


Fig. 1-A. Room advancing in bad top

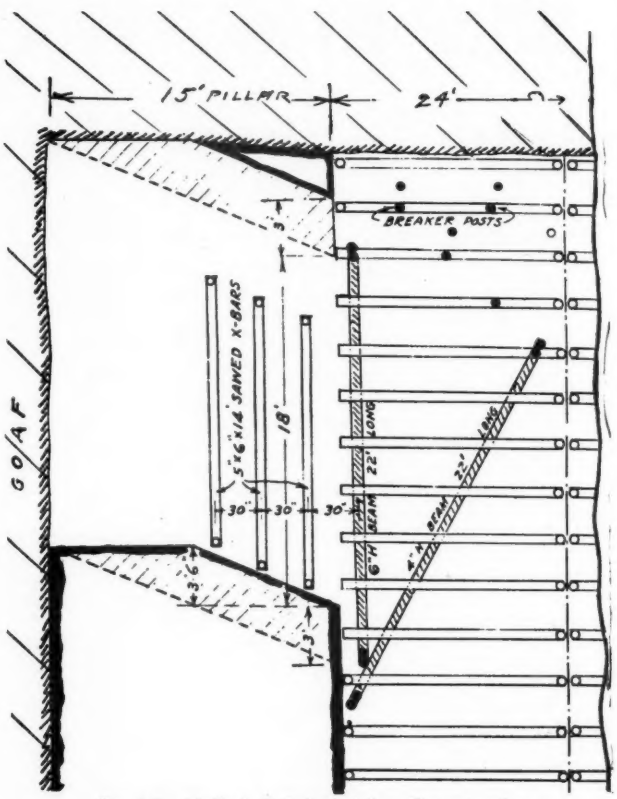


Fig. 1-B. Method of timbering for pillar extraction

for the crossbar sets and face posting is shown in Fig. 1-A.

The 24-ft rooms were driven on 39-ft centers, leaving a 15-ft rib to be mined on the retreat which was done by 18-ft cutovers. Turning the cutovers under the drawslate necessitated the supporting of the ends of the 12-ft crossbars with 6-in. steel H-beams, 22 ft long, as shown in Fig. 1-B. The narrow 15-ft ribs were insufficient for the overlying strata and a squeeze resulted. The heavy slate and the additional weight caused by the squeeze made the H-beam sag to such an extent that the 42 in. high shuttlecars were often unable to get under the beams. The weight of the roof also crushed the drawslate and caused it to come down on the coal when it was shot.

This system was later abandoned because of the excessive timbering, the difficult mining conditions, the low production, and the amount of dirt loaded with the coal.

The Block System

The equipment from Mine A was moved to Mine B which operated the same coal seam. Here the roof conditions are somewhat different inasmuch as the slate is hard and regular, about 12 in. in thickness, and full of slips. Above the slate the roof measures are similar to those at Mine A. There is 320 ft of cover at Mine B, as compared to 200 ft at Mine A. The block system is used at Mine B as shown in Fig. 2; rooms and breakthroughs are driven 14 ft wide with rooms on 122-ft centers and breakthroughs on 49-ft centers; pillars are mined by cutovers 18 ft wide, with five machine cuts 9 ft deep.

The drawslate has been found to stay up much better in the face places than in the butt places, so the mining plan has been laid out to extract all of the blocks with face places. It was also found that more slate could be held if the slate in certain critical areas was taken down according to plan rather than to wait until conditions became such that it had to be taken down. It is estimated that approximately 63 per cent of the slate is now being held under the above mentioned plan. The practice of taking the slate down in the breakthroughs simplifies the timbering as shown in Fig. 3. The elimination of the string

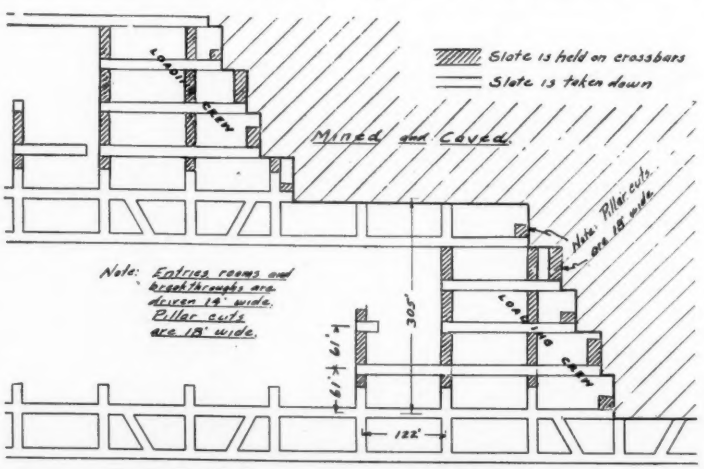


Fig. 2. The block system proved more suitable for weak roof

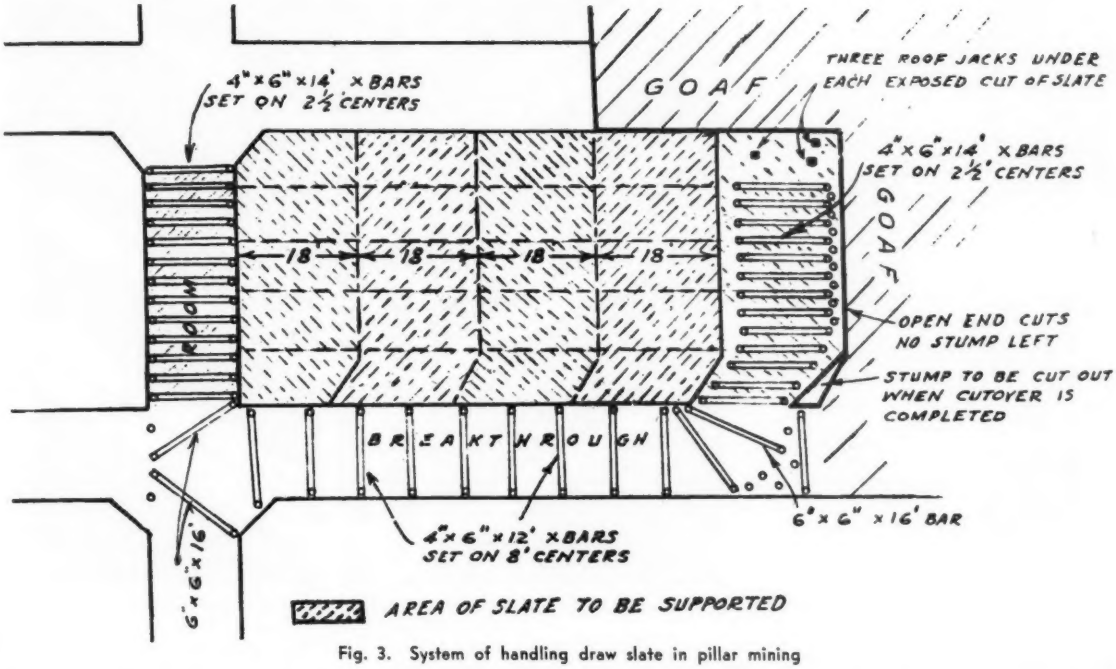


Fig. 3. System of handling draw slate in pillar mining

bar, which would be necessary if slate was supported at the intersection of the breakthroughs and the rib cutovers (as shown in Fig. 1-B). increases the clearance over the shuttle cars which makes it possible to put a greater load on the cars and to move them quicker and safer. The slate in the rib cutovers stands unusually well due to the method of mining on the face, the lack of crushing on the coal face, and the small length of time that the roof is exposed to the air.

The development is done with the two-entry system, the entries being driven to their limit before rooms are turned and mining begun. The rib line is flat, approximately 60 deg, and may extend over two or more butt entries. No difficulty is encountered in making falls as soon as mining in a cutover is completed as long as no stumps are left standing.

The block system, as just described, has proved a satisfactory method of mining clean coal under adverse roof conditions and is definitely a considerable improvement over the room and pillar system.

MINING UNDER VERY WEAK ROOF

By A. E. Spotti
Committee on Roof Action

WEAK roof that requires close timbering and even lagging, is characterized by the committee as being unfavorable or even prohibitive for pillar recovery and the report presented here describes an operation under roof conditions of this nature. Since it has been found impractical to recover pillars, the alternative plan has been adopted of driving wide rooms with narrow pillars to get maximum extraction on the first and only mining.

This mine operates in the Pittsburgh No. 8 seam which has an average coal height of five feet. The bottom is a rather soft shale. The top over the coal is a consistent one-foot layer of drawslate, and above the drawslate is another seam of coal, varying from just a trace to five feet in thickness, but generally averaging three feet. This coal, locally referred to as "roof coal," serves as the mine roof. However this material does not always display the normal strength commonly associated with coal. It is rather friable, varies in thickness, and is generally of uncertain nature. A soft, gray shale, badly fractured and slickensided, overlies the roof coal and ranges from 6 to 15 ft in thickness. This material has little or no

This condition makes pillar recovery impracticable

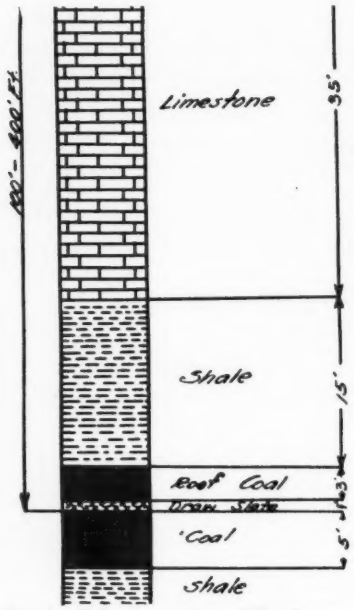


Fig. 4. Columnar section of No. 8 seam

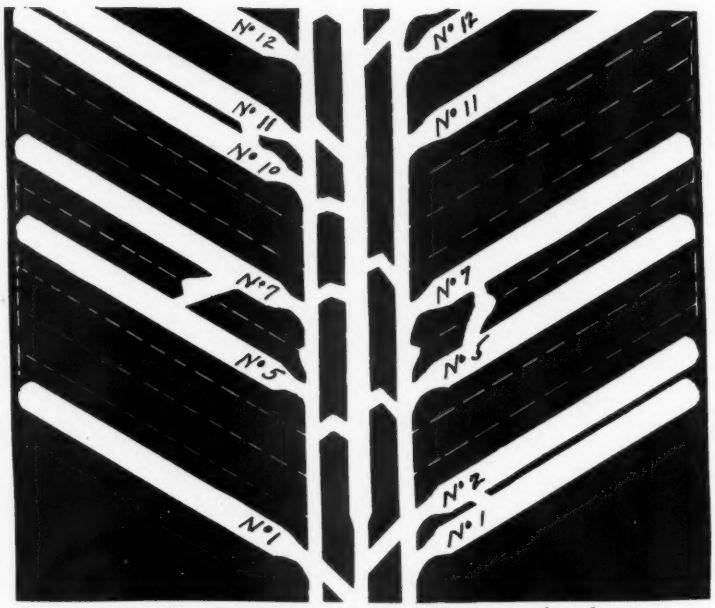


Fig. 5. Advancing-retreating system for very weak roof

structural strength and caves at the slightest break in the roof coal. The limestone caprock covering this shale has a thickness of from 6 to 35 ft. It is massive, of great strength, and attempts to break it into controlled falls have not been successful. Overburden ranges from 100 to 400 ft. (See Fig. 4).

This mine is entirely mechanized with track-mounted equipment, operating by the room-and-pillar system. Main headings are driven in sets of four or five, 12 ft wide and on 45-ft centers. Room entries are turned on 625-ft centers and advanced in sets of three. The center entry is driven 18 ft wide and serves as the haulage heading, but the outer two are airways and are held to 12 ft in width. Panels of 11 or 12 rooms are turned at 60 deg from the outside entries on 35-ft centers and driven 22 ft wide and 290 ft deep. The entries generally have four 12-room panels on each side, or a total of eight "set-ups," which gives about 90 rooms to one set of entries. One 12-room panel is worked at a time and the panels are mined on the retreat. Lately a system of advancing entries with the simultaneous workings of five rooms has been found successful—resulting in a combination of development and wide-room production. (See Fig. 5.)

As has been stated, roof control is a big factor at this mine and at present scrap steel rail crossbars, of 60- or 85-lb weight, are being set on 4½-ft centers in all entries. Steel rails are also used in all rooms on either 4½ or 9-ft centers, depending on the local roof conditions. The crossbars are set on posts, and in rooms each bar is double-posted on each end. Road posts are set between timbers and additional posts are placed in the gob area. At face areas, where the roof coal has failed and a fall has occurred, cribbing and lagging are required. This extensive use of steel and posts necessitates a high recovery of roof-support material which is accomplished by highly skilled timber recovery crews utilizing truck-mounted crab hoists.

Jet Piercing Development Continues

DURING the summer of 1947 field tests by the Linde Air Products Co. were resumed at Babbitt, Minn. The rig used the previous summer had been modified and a radical new design of blowpipe made it possible to omit the flux previously used. The process, recognizing that the spalling action takes place with little or no fusion, is termed "jet piercing."

Nearly 40 holes were pierced in the representative formations on that property. Holes pierced averaged 9-in. in diam and 31 ft deep. Of the 1180 ft of pierced hole, over 400 ft were pierced with Reserve Mining Co. employes at the controls.

Before suspending operations for the winter, the rig was moved to the Erie Mining Co. property at Aurora, Minn., to work on a proposed sink cut area. Under actual winter conditions 15 holes, 9 in. in diam and about 31 ft deep, were pierced at an average speed of 21 ft per hr. One of these holes was pierced at an average speed of 30 ft per hr.

All of this work was done with a truck-mounted rig capable of producing only vertical blast holes. Throughout the summer a smaller rig, capable of producing holes at any angle from horizontal to vertical, was tested at many locations. This experimental rig consisted of a blowpipe mounted on a standard portable wagon drill. The power unit and auxiliaries were carried on a light truck. The 14-ft blowpipe produced a 31½-in. diam hole. This rig was tested in high grade quartzite, dolomite, low grade iron ore, and common granite.

As a result of the 1947 field tests it has been possible to formulate the requirements of commercial equipment for producing vertical blast holes. The rig, as now visualized, will have full crawler mounting permitting most hole-to-hole moves to be made with the mast erect. Powered levelling jacks will reduce setup time after a move. Such a rig will permit hole-to-hole moves and fast setups. Based on an average speed of 20 to 25 ft per hr, a minimum of 100 to 150 ft of hole per shift could be expected.

The Bucyrus-Erie Co. in South Milwaukee, Wis., is cooperating actively with Linde in the development of the first commercial equipment. It is expected that the equipment for piercing primary blast holes will be ready at least by late summer of 1948.

As Viewed by A. W. DICKINSON of the American Mining Congress

RAPID handling of bills which meet the approval of House and Senate leaders is now the order of the day, with sights set on June 18 for adjournment. The House now has the Selective Service bill, which meets the full approval of Defense Secretary Forrestal, calling for registration between the ages of 18 and 30 and providing for the drafting of men in the 19 to 25 age group. The time remaining is sufficient to handle this measure as well as the appropriation bills and such other legislation as may be needed. Soon to be reported by the House Ways and Means Committee is the administrative provisions tax revision bill, to remove inequities in the present revenue law. While time is short on this measure, there is still time for it to be approved by both Houses before adjournment.

Wage-Hour Amendments

Chairman Ball's (Rep., Minn.) Senate Labor Subcommittee has concluded hearings begun April 19 on the Ball bill, S. 2386, to amend the Wage-Hour Act, which was discussed in our last issue.

On April 22, Charles R. Kuzell, assistant general manager, Phelps Dodge Corp., Douglas, Ariz., presented testimony for the American Mining Congress before the Ball subcommittee. He set forth the Mining Congress' position, as adopted at the El Paso Convention in October, calling for amendment to eliminate those features which hamper production, and for specific definitions of such terms as "regular rate of pay," "executive, administrative and professional" employes, and others relating to coverage and administration of the law, in order to remove uncertainties and relieve industry of unnecessary burdens.

Mr. Kuzell pointed out that although the mining industry may not appear to be directly concerned with the proposed increase in the minimum wage, mining men doubt the wisdom of an increase because the pressure to maintain traditional differentials between the statutory minimum rate and the going rates for all job classifications would tend to force up all other wage rates, with obvious effects in higher living costs which would then supply the basis for still further wage demands.

He urged that if overtime provisions are to be retained, Congress should at least remove the uncertainties as to coverage and procedures and the staggering administrative burdens now imposed upon employers by the Act. He presented an exhibit of 64 payroll examples which impressed the committee with the extremely complicated problems that must be solved by the employer, his timekeeper and his accountants in their efforts to avoid violations of the Act, and submitted specific suggestions as to items that should be excluded in computing overtime rates.

This presentation so impressed Senator Ball that he told his constituents in his weekly News Letter that his subcommittee is working on a definition which will clarify the term "regular rate of pay" and yet not drive small employers crazy with complicated bookkeeping. The Ball News Letter continued, "We heard one mine employer explain the intricacies of timekeeping and wage computations under present law and our respect for payroll clerks rose 1000 per cent." He followed with the comment, "The uncertainty of defining 'regular rate of pay' or 'hours worked' forms the main headache of employers and accountants for the great bulk of violations and of employer liability under the existing law."

Kuzell urged that the employer be not required to include the "reasonable cost of board and lodging" for purposes of determining the weekly overtime premium, and cited the hardship and uncertainty which this inclusion has caused in the remote mining camps of Alaska, where it is impossible to forecast what the actual costs of such items will be. He called for the elimination of the independent contractor from the definition of "employe" and asked that Congress provide specific definitions for the types of employes who are exempt from the overtime provisions of the Act. Kuzell suggested that the definition of "supervisor" in the Taft-Hartley Act be adopted as the definition for "executive" in the Wage-Hour Act; that the Taft-Hartley definition of "professional employe" be carried over to the Wage-Hour Act; and that a definition patterned after the one now used by the Administrator be written into the Act for the term "administrative employee." Another recommendation would exempt any employe employed on a salary basis of not less than $300 per month or $70 per week from the overtime provisions.

Social Security

The first report to the Senate Finance Committee of the Stettinius Advisory Council on Social Seecurity, rendered in mid-April, recommends a wide extension of the coverage of Federal old-age and survivors' insur-

Washington Highlights

CONGRESS: Sets sights on June 18 adjournment.

WAGE-HOUR: Kuzell presents A. M. C. testimony.

SOCIAL SECURITY: Mine "leasers" issue active.

TRADE AGREEMENTS: One-year extension.

RUSSELL BILL: In chaotic state.

MINERALS HEARINGS: House Committee seeks to boost production.

POLLUTION: S. 418 reported in House.

SUBMERGED LANDS: Bill passes House.

COAL: Contract negotiations begin May 18.

ance. This would include self-employed persons, farm and domestic workers, employes of non-profit institutions, employes of Federal, state and local governments, railroad employes, and members of the armed forces. Also suggested is a commission to determine the kind of social security program appropriate to the possessions of the United States.

The report calls for: (1) increasing the upper limit on earnings subject to contributions and credited for benefits, from $3000 to $4200; (2) raising benefits to a range of $20 to $78.75 per month; (3) lowering the retirement age for women to 60; and (4) making it easier for older workers retiring after only a few years of service to receive adequate benefits. The Council would increase contributions by employes and employers to 1½ per cent in 1950 and to 2 per cent in 1952, with any needs in excess of the 2 per cent contributions to be met by the Federal Government.

An early report is anticipated by the Senate Committee on Finance on Representative Gearhart's (Rep., Calif.) bill, H. J. Res. 296, which has the effect of continuing mine "leasers" as independent contractors for whom the operator of a mine need not pay Social Security taxes. It will be remembered that the House passed this measure by a vote of 314 to 36. It is of interest to note that the recent White House veto of a bill exempting certain news vendors, who are independent contractors, from the Social Security Act coverage, was overriden by the House 307 to 28 and by the Senate by a vote of 77 to 7.

Foreign Trade Agreements

A subcommittee of the House Committee on Ways and Means is now conducting closed hearings on the Administration's proposal to extend the authority of the President to enter into reciprocal foreign trade agreements for three years beyond the present expiration date June 12. Although there is strong feeling among the majority leaders in both Houses against the trade agreements authority, it is the general impression that this will be extended for one year from June 12—the intention being to overhaul tariff procedures in the 1949 session of the Congress.

In a surprise move late in April, Chairman Harold Knutson (Rep., Minn.) of the House Committee on Ways and Means, introduced a bill, H. R. 3635, which would suspend the duties on lead and certain lead products until July 1, 1949. The proposed suspension would apply to lead-bearing ores, flue dust and mattes of all kinds, lead bullion or base bullion, lead in pigs and bars, lead dross, reclaimed lead, scrap lead, antimonial scrap lead, type metal, babbitt metal, solder, all alloys or combinations of lead not specially provided for, lead in sheets, pipe, shot, glaziers' lead, and lead wire. There is a move on foot to strike out the last nine items beginning with type metal.

Russell Bill

At present U. S. Bureau of Mines officials are engaged in discussions with Representative Russell (Rep., Nev.) and other interested members of Congress concerning a further draft of a metals and minerals incentive payment bill which is based upon suggestions by mining men who have been in conference in Washington. The measure would call for yearly contracts with individual producers of strategic metals and minerals for all or part of their production at higher than market prices. Such additional production would go to the national stockpile. Incentive exploration payments would be provided to stimulate exploration and development of additional ore reserves. It is understood that any minerals incentive payments bill drafted to replace the Russell bill, H. R. 2455, which has been on the House calendar with a rule since July, 1947, must have the approval of the Department of Interior and the Department of National Defense in order to get a green light from congressional leaders.

On April 29, the Department of Interior's National Minerals Advisory Council under Chairman Donald H. McLaughlin, met and received reports from its subcommittees. The report of S. H. Williston's Subcommittee on Premium Price and Subsidies, as amended and approved by the full Council, is of particular significance in view of the current legislative activity on minerals incentive payments. It reads:

"It is the consensus of opinion of the committee:

"(1) That in times of peace, incentive production payments for metals in excess of market prices are not economically justified.

"(2) That under emergency conditions, if defense authorities now require additional metals or minerals for stockpile, production incentives, including but not limited to maintenance of manpower, tax reform, and payments of premium prices or subsidies, may be advisable.

"(3) That defense authorities should immediately decide this question so that, if necessary, legislation can be obtained to authorize production incentives in this session of Congress."

In its report to the full Council Mr. Williston's subcommittee called attention to the current unsettled foreign situation and the necessity for a definite policy on mineral incentives. The report then stated, "The problem put before this committee at this time is not whether premiums are advisable in times of peace, but whether incentive plans for metals can help the nation in view of the current unsettled foreign situation, the acute shortages of metal for industry, the possible imminence of a national emergency and the generally unsatisfactory situation of our national stockpiles."

Minerals Resources Hearings

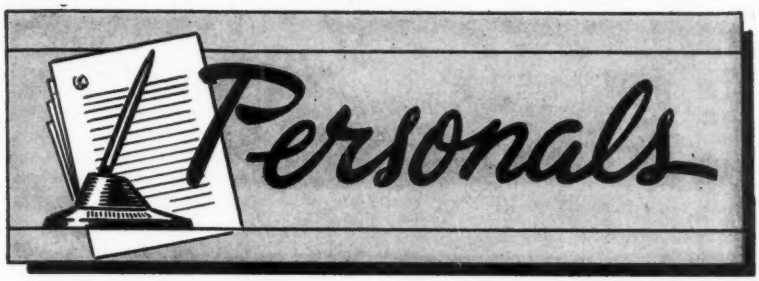
Hearings before the House Public Lands Mines and Mining subcommittee investigating U. S. mineral resources continued during the month with copper producers giving details of the operation of their industry.

President R. H. Page of Phelps Dodge Corp. explained that at present a stockpile cannot be built up from current domestic production without serious effect on the domestic economy. He also stated that he believed that few people would seriously quarrel with the idea of paying above-market prices for copper for the purpose of building up the stockpile. He suggested the following plan for acquiring stockpile copper at over-market prices: (1) place procurement for the stockpile in the hands of a single administrator with experience in the mining industry and knowledge of metal markets; (2) empower this administrator to buy copper for the stockpile from the domestic market when available without interference with the domestic economy and without complicated procedures; (3) permit purchase of foreign copper on a long-term contractual basis, if necessary; and (4) as regards premium prices, empower the administrator to make contracts on a mine-to-mine basis for a long enough period of time to induce the operators to go ahead, and where necessary to pay a price which would include enough to amortize any initial development required.

Edgar L. Rossin, vice president, Miami Copper Co., called for reimposition of the copper import excise tax when domestic supply and demand are in balance. He said a "going" domestic industry is most effective for development of new ore bodies. He advocated premium payments to encourage new ore production but cautioned that any such plan be less complicated than the wartime Premium Price Plan.

W. W. Lynch, Calumet & Hecla Consolidated Copper Co., testified that rising labor and supply costs will force his company's underground mines in Michigan to close unless governmental financial aid is forthcoming at this session of Congress. He said that keeping these mines ac-

(Continued on page 54)



P. G. Beckett has announced his plans to move from Douglas to Phoenix, Ariz., late in May. He has purchased a home in the Arizona Biltmore Hotel grounds, northeast of Phoenix, and plans to "just enjoy life." Mr. Beckett, who retired as vice president and general manager of Phelps Dodge Corp. in April, 1946, spent 25 years with the corporation maintaining headquarters at Douglas.

W. C. Fancourt is now chief engineer of the Mine Sealing Division, Pennsylvania Department of Mines. He was formerly associated with the Berwind-White Coal Mining Co., Eastern Gas & Fuel Associates, and the Bird Coal Co.

Ernest Oberbillig has resigned his position as general superintendent of Bonanza Mines, Inc., Yellow Pine, Idaho, and is now located at Atlanta, Idaho, where he is also interested in antimony mining.

Durward R. Schooler, formerly assistant professor of mining at the Missouri School of Mines, is now on the staff of the Paul Weir Co., Chicago, Ill., as a consulting engineer.

Carroll Ward, formerly with the Montana Rainbow Mining Co. at Marysville, Mont., has been named general manager of the Emery mine in Powell County, Mont. Porter Bros. Corp. controls the Deer Lodge Mining Co. which operates the Emery mine.

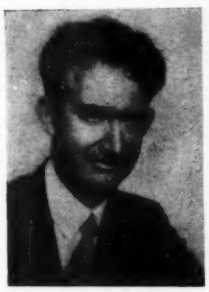
J. B. Morrow, president of the Pittsburgh Coal Co. since November 1938, is now chairman of the board of directors for the company. **G. A. Shoemaker,** formerly vice president of operations has succeeded Mr. Morrow as president. **Henry C. Rose,** has been named vice president of operations.

F. W. McQuiston, Jr., is a consulting metallurgist of the raw materials division of the AEC, with his headquarters in Washington, D. C. Formerly Mr. McQuiston was a metallurgical engineer for the Newmont Mining Corp. He will continue in his capacity as consulting metallurgist for Getchell Mine, Inc., Red House, Nev.

Carl E. Miller is now connected with Battelle Memorial Institute, Columbus, Ohio, to serve on that research organization's research advisory staff. Mr. Miller will serve as a technical advisor on research in coal, gas, and petroleum technology.

William Gage Brady, Jr., chairman of the board of directors of the National City Bank of New York, has been elected a director of the Anaconda Copper Mining Co. to fill the vacancy created by the death of the late Gordon S. Rentschler.

Daniel Harrington, Chief of the Health and Safety Division, of the U. S. Bureau of Mines, retired on May 1 after more than three decades of Government service. However, his fight for improvements in mine safety will continue. As in the past, Mr. Harrington's efforts will be directed toward solution of the manifold problems of accident prevention in his life-long drive to make mining a healthier and safer industry.



Eugene P. Pfleider, formerly mine superintendent for Nicaro Nickel Co. in Cuba has been appointed a member of the faculty of the School of Mines and Metallurgy of the University of Minnesota.

Harry Swihart, general superintendent, Simpson Creek Colleries Co., Galloway, W. Va., has been named vice president in charge of the company's operations.

David Bruce Leake, of Santa Rita, N. Mex., was appointed Deputy State Mine Inspector, to succeed **Charles L. Knaus,** who resigned. Leake has been engaged in mining in Southwest New Mexico for more than 30 years as a metal miner and operator.

F. V. Hicks, formerly superintendent of the company's Geneva Coal mine is now general superintendent of mines for the Geneva Steel Co., Geneva, Utah.

Philip W. Chase has been named manager of explorations for the Oliver Iron Mining Co., Duluth, Minn. In his new position Mr. Chase will direct explorations and investigations on a world-wide basis in the search for raw materials for iron and steel manufacture.

A. F. Whitt, formerly chief engineer of the Rail and River Coal Co., is now general manager of the Pyramid Coal Co. of Indiana. **Luis G. Jordan, Jr.,** now fills the post of chief engineer of the Rail and River Coal Co.

Dr. **Harrison Schmitt,** consulting geologist of Silver City, N. M., is delivering a series of lectures before AIME sections in the Southwest. In February he delivered an address before the national meeting held in New York City, and in March he spoke before the Silver City section at Santa Rita. On April 2 Dr. Schmitt addressed the All-Engineers Conference held at Albuquerque and on April 14 was guest speaker at the El Paso section of the AIME.

Earl R. Maize, who has been associated with the U. S. Bureau of Mines for the past twenty years, has been appointed director of the newly created Safety Division of the National Coal Association.

Hugh Morrow, who has been president of Sloss-Sheffield Steel and Iron Co. since 1925, has been elected chairman of the board. **Claude S. Lawson,** former vice president, was named president. **John S. Coleman,** president Birmingham Trust National Bank, has been elected a director.

William R. Callaway, formerly vice president of the Mining Association of Montana and president of the Madison County Mining Association, has resigned as manager of Victoria Mines, Inc., Sheridan, Mont., to become associated with the Hodges Research and Development Co. of Redwood City, Calif.

After more than 30 years of association with Imperial Coal Corp., Johnstown, Pa., **James M. Cook,** vice president in charge of operations, has retired.

Friends or relatives of **Charles Mitchell** are sought by **John F. O'Donnell**, Chief of Police, Denver, Colo. Mr. Mitchell, a mining engineer, has been a paralytic patient for the last three years at the County Hospital at Canton, N. C.

Preston H. Haskell, Jr., has resigned as vice president in charge of coal mine operations for the Alabama By-Products Corp., to become president of the Southern Minerals Co., Birmingham, which operates strip mines in northern Alabama.

Henry R. Wardwell has left his position with U. S. Vanadium Corp. and is now employed as geologist with the Magma Copper Co., Superior, Ariz.

Jesse F. Core, formerly assistant superintendent of the Banning No. 1 mine of the Pittsburgh Consolidation Coal Co., is now a chief engineer with Buckeye Coal Co., Nemacolin, Pa.

W. E. Warnke, formerly managing director of the White Pine Chamber of Commerce and Mines at Ely, Nev., has been appointed associate metallurgist with the U. S. Bureau of Mines and will now be located at College Park, Md.

J. N. Hedding, formerly superintendent of the Vesta No. 5 mine of the Jones and Laughlin Steel Corp., is now production engineer in the Uniontown, Pa., district of the Republic Steel Corp.

Dr. **Bert S. Butler** will retire on July 1 as head of the department of geology and mineralogy of the University of Arizona, Tucson. Dr. Butler has been a member of the University of Arizona staff since 1928, and after his retirement as department head he will continue his affiliation with the university on a half-time basis. Dr. **Maxwell N. Short** will succeed him as head of the department.

D. T. Sorrent has become a partner in the Paint Creek Coal Co., which operates a mine near Peach Creek, W. Va. Other partners of this company are L. F. Gerenge and C. J. Stevens. Formerly Mr. Sorrent was associated with Island Creek Coal Co. in various supervisory positions.

Carl M. Loeb, Jr., has been elected a director of the Climax Molybdenum Co.

Ray Gallant, manager of the industrial department of the Montana Hardware Co., Butte, Mont., is now associated with the explosives department of the E. I. du Pont de Nemours Co. in the Denver district.

Robert Q. Gribble has been appointed to the technical staff of Battelle Institute, Columbus, Ohio, and assigned to research in mineral technology.

William E. Cunningham of the Consolidation Coal Co. (Ky.) is now assistant mine foreman at Mine No. 25, near Clarksburg, W. Va.

John R. C. Mann, president of Empire Star Mines Co., Ltd., affiliate of Newmont Mining Corp., has been named president of the newly organized Goldfield Columbus Mining Co. which recently acquired several patented mining claims near Goldfield, Nev.

D. H. Pape, who retired from his long association with the Sheridan-Wyoming Coal Co., Inc., as president, at the first of the year, remains active in fostering the progress of the coal mining industry. He materially assisted in promoting the establishment of the new pilot briquetting plant which was dedicated at the University of Wyoming at Laramie, Wyo., on April 9. At the dedication ceremony he addressed the meeting in an endeavor to promote a contribution to aid the University of Wyoming and coal producers in that state to carry on important research work in coal mining. On April 12 he spoke before the Idaho Retail Coal Dealers Association in Sun Valley, Idaho, on "Important Factors in the Coal Industry."

Joseph E. Fowells is now resident geologist for the Miami Copper Co., Miami, Ariz.

Robert P. Bremner, Jr., formerly mining captain of the Newport mine of Pickands, Mather and Co. at Ironwood, Mich, is now located at Youngstown, Ohio, in the raw materials department of the Youngstown Sheet and Tube Co.

S. G. Sargis, formerly assistant superintendent of mines at Columbia, Utah, has been appointed supervisor of raw materials for the Geneva Steel Co., Geneva, Utah.

Sidney M. Ward of Clinton, Mont., has been elected president of the Western Montana Mine Owners and Operators Association.

— *Obituaries* —

Ringwald Blix of Seattle, Wash., one of the honored members of the thinning fraternity who trekked into Alaska in the big gold rush, and became miner, roadhouse operator, and U. S. Commissioner in pioneering days, died recently, age 75, in a Seattle hospital.

Robert E. Phelan, who was instrumental in developing Flin Flon for the Hudson Bay Mining & Smelting Co. in the early years, and who was at other times employed at the Basic Magnesium plant in Nevada and Kalunite, Inc., Salt Lake City, died in Carson City, Nev., at the age of 62.

Harry J. Williams, who had been master mechanic at the Nevada Mines Div., Kennecott Copper Corp., died in San Francisco on February 22, at the age of 55.

John C. Cortellini, ex-mayor of Leadville, Colo., who had been associated with the Ibex, Resurrection, and Breece mining companies, died recently in Leadville.

W. M. Saben, 66, died in San Diego, Calif., March 28. At the time of his retirement, April 1, 1940, Mr. Saben was manager of the United Verde Branch, Phelps Dodge Corp., Jerome, Ariz. He joined the engineering staff of the Copper Queen mine in Bisbee in 1910, and gradually was promoted until he was chief clerk at Bisbee. He then was transferred to Morenci, where he became assistant manager of the Morenci Branch. In 1924 he was returned to Bisbee as assistant manager of the Copper Queen Branch, and in 1931 was made assistant to the vice president and general manager of Phelps Dodge with headquarters in Douglas, from which position he was promoted to manager of the United Verde. Since his retirement he had resided in San Diego.

Ralph B. Williams, president of the American Rutile Corp., died on April 6, 1948, after an extended illness. Mr. Williams was born in 1881 in Salem, Mass., and was graduated from the Massachusetts Institute of Technology in 1904. Until 1916 he was engaged in mining work which took him to South America, Mexico, and various portions of the United States.

He joined the Metal & Thermit Corp. as a consulting mining engineer in 1916 to investigate tin and tungsten properties in both the United States and South America. When the American Rutile Corp. was acquired by Metal & Thermit Corp. in 1919, Mr. Williams become general manager of the American Rutile Corp., in which position he remained until 1935 when he was elected president.

Mechanical Problems of Shaft Installation

(*Continued from page 26*)

pressed steel flanges. The shell runs on ball bearings with grease shields and the shaft bolts to angle brackets. Roller spacing averages 50 ft, but is made unequal so as to dampen any harmonics. In the latest design, the weight of the roller has been reduced by using aluminum alloy. It is the same size as the steel roller, but has a thinner tread made of neoprene vulcanized to the aluminum outer ring. This design has reduced the weight of the rotating parts from 49 lb to 19 lb. The new roller is expected to add to the rope life due to its reduced WR^2 and because the neoprene will not groove as readily as the synthetic rubber.

A ropeway hoist is provided for transporting men and equipment from the hoist up to the head sheave. It is slow speed and has a light-weight, aluminum skip. A control line is placed along the ropeway wall so that the little hoist can be stopped or started from the skip in any position.

Idler sheaves were first located approximately midway up the rope raise but in this position the overwind rope was being subjected to a bad harmonic with the rope swing being amplified with each crossover. The idler sheave has now been moved down the rope raise 40 ft closer to the hoist and the harmonic trouble removed.

Now the rope winds on the drums quite satisfactorily on all layers. Much of the credit for this is due the mining engineers for their accurate survey work in locating the lines from which the hoist was set in true relationship to the shaft.

The mechanical equipment described here was all built in company shops. A dual benefit was derived from this; the equipment was well built by men with many years of shop experience in handling the problems of the mine, and it was built at a time when it was difficult to obtain good quality workmanship in contract shops elsewhere. Pride of workmanship in a job well-done is in evidence with the men who built the equipment and installed the hoist.

Work is going forward on the White Raise part of the program. A similar arch construction will be used, but with 18 in. instead of 15 in. Cor-ten I-beams due to heavier ground conditions. Only two more arch beams need be placed. The arch will run crosswise to the shaft. The hoist will be overhauled and new Lilly safety and electrical controls installed. Completion of the White Raise installation will require another year.

Features of the new 1200-hp hoist, electric equipment, and type of control, concrete placements, and mining methods used were described in the July 1947, issue of *Engineering and Mining Journal*.

Pumping Discloses Old Timber

After pumping out the Champion iron mine shaft of the North Range Mining Co., the old timbers were found to be in excellent condition although submerged for 38 years. The mine has been idle since 1910 until January 1948 when pumping operations were begun. The timbers used in the mine at the time of the previous operation were of white pine.

Largest Coal Mine

Rated according to the total tonnage produced in 1946, the largest coal mine in the United States is the New Orient mine of the Chicago, Wilmington and Franklin Coal Co. at West Frankfort, Ill. In 1946, 2,469,470 tons were produced. The mine has a daily capacity of 11,000 tons.

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MECHANICAL FEED
HORIZONTAL DRILL
WITH TRACTION DRIVE

Ten years of field test has proven that our power-feed design of direct, transmission and worm gearing with two-speed control will not only cut shot hole drilling time in half but also eliminates costly maintenance delays. V-belt drive to the power-feed with an additional ample clutch in that assembly gives absolute control of a drilling speed of two to three feet per minute with a retrieving speed of twenty-four feet per minute.

The Parmanco Horizontal is adapted to all forms of high-wall drilling, will handle a six-inch auger up to a distance of sixty feet or more and, by use of our patented augers with interrupted flights and secondary cutters, will drill an absolutely clean hole with a minimum of torque. It permits the drilling of a controlled-angle hole which makes possible a great saving of explosives through the cantilever effect of this controlled-angle drilled hole.

EFFICIENT STRIPPING STARTS
WITH EFFICIENT DRILLING

PARIS MANUFACTURING COMPANY
PARIS, ILLINOIS

Wheels of Government

(*Continued from page 50*)

tive is more important to our national security than "putting small amounts of copper in the stockpile."

Richard Newlin, Anaconda Copper Mining Co., told the committee that mining loans for the development of potentially productive properties would be more helpful in stimulating production than a revised Premium Price Plan.

On May 3, Rear Admiral Roger W. Paine of the Munitions Board told the committee that the Board is under instructions from the Administration to disregard the "buy American" clause of the Stockpiling Act of 1946, and that about 90 per cent of the Board's purchases have been made from foreign sources. He said the State Department is responsible for setting this policy in order to place dollars in the hands of foreign nations with which to advance foreign trade. Paine said, however, that the Board is now preparing to go into a program of long-term contracts with domestic sources or within the Western Hemisphere, for procurement of 67 critical and strategic materials for the national stockpile. He blamed the lack of appropriations for the slow action on stockpiling.

Water Pollution

On April 28, the House Committee on Public Works reported the Taft-Barkley water pollution bill, S. 418, and early House action is anticipated on the measure. The bill was passed by the Senate last July. The House committee retained the Senate enforcement procedure for pollution abatement but eliminated the provisions for loans to industries for construction of abatement facilities. The authorization for loans to state, municipality or interstate agencies for construction of treatment works is reduced from $100 million annually to $20 million and other state allotments are reduced in proportion. A $4 million pollution research station is authorized to be located at Cincinnati for the study of pollution of interstate waters.

Submerged Lands

On April 30, the House passed by a vote of 257 to 29 the Chadwick (Rep., Pa.) Submerged Lands bill which is a companion measure to the Moore (Rep., Okla.) measure, S. 1988, as discussed in our April issue.

Meanwhile in the Senate the Moore-Donnell-McCarran Judiciary Subcommittee is holding additional hearings on S. 1988 at the insistence of Senator Donnell.

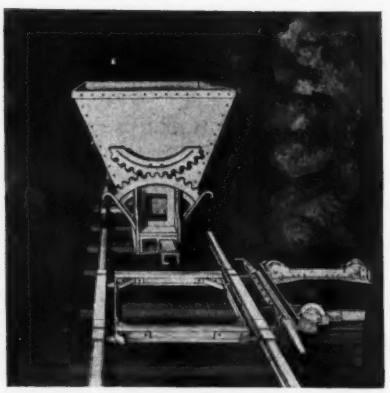
When the Chadwick bill arrived in the Senate on May 3, Senator Downey (Dem., Calif.) through a parliamentary maneuver had it placed on the Senate calendar instead of going to the Judiciary Committee. This could result in early consideration of the bill by the Senate although more regular tactics may be used in order to insure a vote sufficient to override an anticipated White House veto.

Coal Industry Problems

Bituminous coal operators were invited by John L. Lewis on April 30 to meet with the Mine Workers May 18 to negotiate a new wage agreement. Thus the "notice" was given 60 days before the expiration date of the wage contract on June 30 as called for under the Taft-Hartley Act. No indication has been given as to what the miners' demands may be.

The miners' strike ended April 12 after 29 days of idleness, following the use by the Government of the power given under the Taft-Hartley Act. For failure to comply with a Federal court order issued upon the U. S. Attorney General's petition, the UMWA was fined $1,400,000 and Lewis was given a fine of $20,000. The miners are under a court restraining order forbidding a strike for 80 days.

Load a train of empties on a single track



Quickly Pays for Itself

The Canton Car Transfer saves time and money where tunnel space is costly.

Operation is simple. Push train of empties to the face. While first car is being loaded, pull other empties back to Canton Car Transfer position and shunt the next empty car on to transfer section. Push trip up to loaded car, couple, and pull it out beyond Canton Car Transfer position. Transfer empty to main track, push car up to loader. Repeat the procedure until all empties are filled.

Coupling and transferring cars is done while empty car is being loaded.

Canton Car Transfers are made for all track gauges, can be placed on track at any spot where side room permits—in two (2) minutes by two (2) men—built to hold cars up to six (6) tons in weight. Write for complete descriptive folder. In answering please use street and zone numbers.

The American Mine Door Co. 2063 Dueber Ave. Canton 6, Ohio.

Development of Continuous Coal Mining Machine Planned

A two-year, $250,000 engineering program to design a machine that will mine coal cheaper and faster has been undertaken by Bituminuous Coal Research, Inc. The program's ultimate objective is a machine that will both cut coal "off the solid" without the use of explosives and load the coal continuously onto a conveyor or into mine cars.

Seventy of the nation's leading coal-producing companies, coal land companies, and railroads have joined forces in supporting the project, according to Howard N. Eavenson, president of Bituminous Coal Research, Inc.

Members of the subscribing companies on the mining development committee are:

Max Forester, Pittsburgh Consolidation Coal Co., Chairman; George F. Campbell, Old Ben Coal Corp.; T. H. Clagett, Pocahontas Land Corp. and Norfolk and Western Railway Co.; M. A. Evans, Eastern Gas and Fuel Associates; C. E. Lawall, Western Pocahontas Corp. and Chesapeake and Ohio Railway Co.; T. F. McCarthy, Clearfield Bituminous Coal Corp.; R. H. Morris, Gauley Mountain Coal Co.; R. G. Pfahler, Berwind-White Coal Mining Co.; E. R. Price, Inland Steel Co.; K. M. Quickel, Bethlehem Collieries Corp.; R. E. Salvati, Island Creek Coal Co.

Supporting the director and the mining development committee will be a mining advisory group consisting of engineers and mining men who will advise the director relative to safety and mining requirements which machines must meet to be practical.

First, machinery and methods to produce coal at the face at the lowest possible cost will be developed, and second, the machinery will be put into operation as fast as possible. Those concerned with the development desire a machine that will mine coal in seams of varying thickness and as low as 28 in. The exact type of machine, method of mining, and the size of coal to be produced will be evolved as the project progresses. It is expected that a three-in-one mechanical miner might reduce the labor cost to about 40 per cent per ton as compared with the present average of 65 per cent of each ton.

Producing Mine Purchased

The entire capital stock of the Darr Smokeless Coal Co., operating a mine at Twin Branch, W. Va., has been purchased by the Jones & Laughlin Steel Corp. The mine has been producing 700 to 800 tons per day and reserves are estimated at approximately 10,000,000 tons. The new owners expect to produce 1700 tons per day when full mechanization has been achieved.

With the acquisition of this new low volatile coal in the Davy-Sewell seam, plus the production from mines already owned by Jones & Laughlin, the company will have all the low volatile coal needed to produce the highest quality coke for its plants. The company expects to be able to increase the blast furnace iron production and the steel capacity of its furnaces by utilization of this better grade of coke.

River transportation, with considerable reduction in cost, is made possible due to the location of the mine, however a portion of the route requires that rail transportation be utilized.

Coal Utilization Conference

On April 30, 1948 at the School of Mines, University of Alabama, a Coal Utilization Conference was held under the auspices of a committee composed of members of the staff of the School of Mines cooperating with a number of organizations active in Alabama.

Following an opening session of introduction and welcome by James W. Stewart, head, School of Mines, and James R. Cudworth, dean, College of Engineering of the University of Alabama, three papers were presented at the morning session. The work of the Alabama State Mines Experiment Station was outlined by Reynold Q. Shotts. A paper entitled "Coal for Kilowatts" was presented by Lewis M. Smith, vice president, Alabama Power Co., and the need for mass production of coal was stressed by Ralph E. Kirk, vice president, Tennessee Coal, Iron and Railroad Co.

I. W. Rouzer, president, Alabama Mining Institute, presided as chairman at a luncheon session. At the

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Oliver Building **Pittsburgh, Pa.**

conclusion of the luncheon an original Rockwell Kent oil painting entitled "That the Days of Our Years May Grow Fuller" was presented to the University of Alabama by Darius A. Thomas, president, Boothton Coal Mining Co., on behalf of the Bituminous Coal Institute.

A. R. Long, president, Brookside-Pratt Mining Co., acted as chairman during the afternoon session. "The Magic of Coal," an educational sound movie, was shown through the courtesy of the Bituminous Coal Institute. Dr. Edward W. Lang, scientist, Southern Research Institute, spoke on research activities, present and future, on coal.

Members of the University Committee directly responsible for organizing this well-attended meeting were: George T. Bator, William D. McIlvaine, Reynold Q. Shotts, and James W. Stewart.

Magnesium Use May Increase

At the Fourth Annual Meeting of the Magnesium Association, held on March 19, Dr. Willard H. Dow, president, Dow Chemical Co., stated that 1948 should mark a record peacetime year for magnesium. Dr. Dow stated, "The basic factors of availability and processing economics are favorable, the only problem appears to be to build up the volume of business to a point where the economics of mass production can be effected."

Red Jacket Coal Corp. Establishes Scholarship

The Red Jacket Coal Corp., one of the southern West Virginia field's large producers, has established two four-year scholarships in coal mining at West Virginia University for the employes or the sons of employes of the corporation, according to an announcement by President Irvin Stewart of the University.

Each of the scholarships, which will provide the successful applicant with a stipend of $600 a year, was arranged by Paul D. Ritter, of Columbus, Ohio, president of the company, and William M. Ritter, of Red Jacket, general manager.

Mining Property Leased

Consolidation Coal Co. (Ky.), announces it has leased, as of April 1, the Winters mine of Elkhorn Collieries Corp. at Farraday, which is on Thornton Creek in Letcher County, Ky. The lease includes coal, equipment, and plant but not the houses or store. The mine is working in the No. 3 Elkhorn seam of coal.

Kenneth Hughes, of Jenkins, has been appointed superintendent and Robert Collins, also of Jenkins, has been appointed general mine foreman.

Gasoline from Coal Research Launched

The Gulf Oil Corp. has undertaken a research project to find out more about the conversion of coal and natural gas into gasoline. Although enough technical knowledge exists to proceed with commercial production, a better understanding of what happens in the reaction when gasoline is produced from coal is necessary for

Measuring isotope content of a sample precipitated from coal-made gasoline

a better estimation of the ultimate possibilities. Radioactive isotopes and many of the latest research techniques are being applied in the study which is going on at the Mellon Institute in Pittsburgh. The radioactive isotopes of carbon, carbon 14, is being used to trace the course of the different reactions. Results obtained may have an important bearing on the future of the gasoline-from-coal program.

Expansion Program Announced by A. S. & R.

Roger W. Straus, chairman, and H. Y. Walker, president, of the American Smelting and Refining Co., revealed in the 1947 annual report that the company plans expenditures of $75,000,000 for current and future plant improvements and for the development of copper, lead, and zinc prospects both domestically and abroad. The largest part of the expenditure program—at least $50,000,000—will be spent for the development of copper, lead, and zinc properties in the United States and in Latin America. Improvements in existing plants which had long been needed will require approximately $25,000,000. Mr. Straus and Mr. Walker stated that while such expenditures will be spent over several years and will not be undertaken in a major way in the immediate future, they must be borne in mind. In line with this investment policy the company purchased during 1947, 134,800 shares of Cerro de Pasco Copper Corp. stock, increased its holdings in Australia, and purchased additional holdings of Silver King Coalition Mines Corp.

Armco Steel Corporation

In a recent announcement, the American Rolling Mill Co., changed its name to Armco Steel Corp. The change is one in name only and does not involve any change in the company's structure, personnel, policy or activities. Long use of the word "Armco" as a trade name and through wide advertising and publicity has given it better recognition than the former company name.

Koppers Will Build Synthetic Oil Plant

By June 1948, construction will have been begun on a $4,400,000 demonstration plant to produce oil from coal. The contract for this construction was awarded to the Koppers Company, Inc., Pittsburgh, according to an announcement by the Secretary of the Interior J. A. Krug. It is expected that the plant will be completed by October 1949. Operation of the new plant will provide basic knowledge which will make it profitable for private industry to build plants of large capacity up to 10,000 bbl or more a day. The experimental plant will have a capacity of 80 bbl of oil and gasoline daily.

Drilling Program Finds Titanium

In its program of investigation of mineral deposits, the Tuscaloosa Branch, Mining Division, of the Bureau of Mines, has conducted a drilling project relative to the occurrence of titanium minerals, zircon, and other heavy minerals in a stabilized dune area known as Trail Ridge in the northeast section of the State of Florida. Field work was carried on from September 9, 1946, through March 31, 1947. A total of 243 holes were completed and 1622 samples were obtained in an area extending from a section along U. S. Highway No. 90 a few miles east of Macclenny, Baker County, south, for a distance of about 32 miles to a section about 3 miles north of Keystone Heights, Clay County. A deposit of

heavy minerals was disclosed which is estimated to be from 3000 to 8000 ft wide and extending from about 2 miles north of Highland, Clay County, southerly, for a distance of about 19 miles to the vicinity of Blue Pond Lake in the southwestern part of the Camp Blanding Military Reservation, Clay County. In places, slightly more than 30 ft of ore-bearing material was penetrated, and the bottom was not reached in a number of holes.

The results obtained indicate that the deposit contains a large tonnage of material averaging 3.9 per cent heavy minerals. It is estimated that the heavy minerals are composed of 54 per cent titanium minerals (largely leucoxene and rutile), 15 per cent zircon, 3 per cent kyanite, 6 per cent sillimanite, 14 per cent staurolite, 5 per cent tourmaline, and traces of corundum, garnet, gahnite, and monazite. The character of the deposit indicates that it would be adaptable to large-scale mining and low-cost recovery methods.

This investigation, by disclosing a mineral deposit related to an ancient shore line, suggests that similar deposits may be found within the state, thus adding other large tonnages to the domestic reserves of these minerals. The holes drilled in this investigation were 1000 ft apart in rows transverse to Trail Ridge, the distance between rows averaging 3 miles. Because of this wide spacing additional drilling should be done to prove the ground in more detail before actual mining operations are contemplated.

A report on the Bureau of Mines development project has been prepared for publication. Copies of the original manuscript are on file at the U. S. Bureau of Mines office, Tuscaloosa, Ala., and at the office of Dr. Herman Gunter, State Geologist, Tallahassee, Fla., where they may be consulted pending publication of the official report.

New Board Members of Woodward Iron Co.

Stockholders of Woodward Iron Co. recently elected the following directors: Fred Ayer, Boston; Keehn W. Berry, New Orleans; William T. Golden, Washington; and H. A. Berg, William H. Brantley, Jr., Bradford C. Colcord, William M. Spencer, Jr., Oscar Wells, and A. H. Woodward, all of Birmingham.

Officers elected are Mr. Colcord, president; A. H. Woodward, chairman; Hewitt Smith, vice president; J. B. DeWolf, vice president; and D. T. Turnbull, assistant secretary and assistant treasurer.

1949 Coal Show at Cleveland

May 9-12 are the dates for the 1949 Coal Show at the Public Auditorium in Cleveland. To assure the fullest possible use of all rooms available, hotel reservations will be handled through a central housing bureau operating under Cleveland's Convention & Visitors Bureau, 511 Terminal Tower. Reservations may be made at any time but assignment of accommodations will not be made until a later date to be decided upon. Full information on hotel facilities, together with reservation forms, will be distributed shortly to the industry.

Staff Changes at Consolidation Coal Co. (W. Va.)

Harold B. Wickey, formerly superintendent at Mine No. 38, in the Fairmont Division has been made general superintendent in charge of Mines Nos. 38, 93, 97 and Everettville. Mr. Wickey has been with the company for more than two years and until his recent promotion has been a special engineer and superintendent at Mine No. 38.

George W. McCaa, who was appointed general superintendent on January 1, 1948, will continue as general superintendent in charge of Mines Nos. 25, 32, 63 and 98.

L. H. Riggs, who has been with the company since 1933, in various capacities as engineer, laboratory assistant, section foreman, and assistant mine foreman, has been appointed to the

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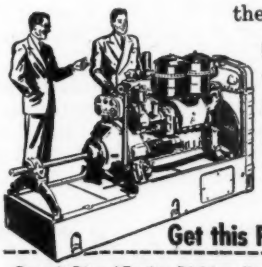

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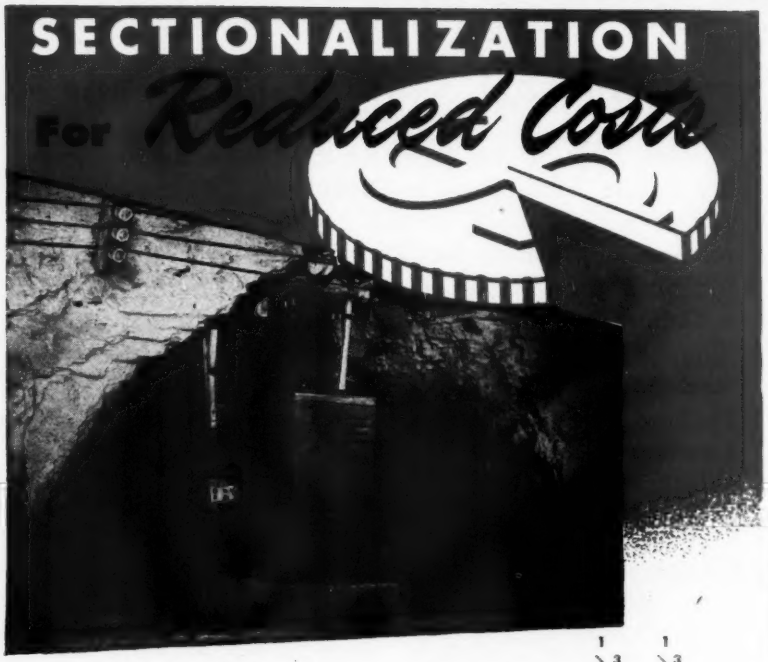

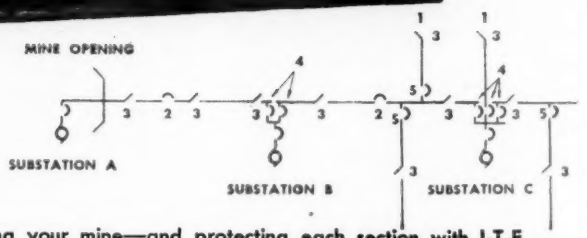

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I-T-E Type KSC Automatic Reclosing Circuit Breakers protect your mine in many other ways. Find out how by contacting the I-T-E Mining Specialist in your neighborhood. He will be glad to make an application analysis of your mine electrical distribution system. Use him—at no obligation. I-T-E Circuit Breaker Company, 19th and Hamilton Streets, Philadelphia 30, Pa.

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position of superintendent of Mine No. 38.

Lester E. Hetrick was appointed superintendent of the Everettville mine, formerly known as the Federal No. 3 mine of Eastern Gas and Fuel Associates. Mr. Hetrick was formerly mine foreman at Mine No. 38.

Jess G. Bowers has been appointed superintendent of Mine No. 98, in Harrison County, W. Va. Mr. Bowers has been with the Consolidation Coal Co. since 1927 and has worked in various positions prior to his recent appointment.

James Gemondo and Raymond Comer are now section foremen at Mine No. 32.

Howard Wills is mine foreman and John Ice is now assistant mine foreman at Mine No. 38.

Lloyd L. Van Pelt is now section foreman at Mine No. 63.

C. V. Rowand and John J. Konkoly have been promoted to section foreman at Mine No. 93.

Roy W. Shanholtz now holds the position of section foreman at Mine No. 98.

Miners Get Unemployment Pay

The Alabama Court of Appeals stated that some 3500 Birmingham coal miners are entitled to unemployment compensation for time lost during a nation-wide steel strike two years ago.

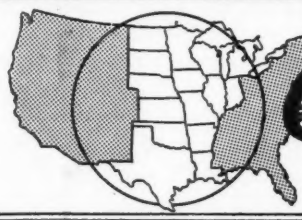
Presiding Judge Charles R. Bricken ordered approximately $200,000 in jobless claims paid to coal miners of the Tennessee Coal, Iron & Railroad Co. The claims cover the period from January 21 to February 18, 1946, when captive coal mines were closed down by strikes among ore miners and steel workers.

Du Pont to Operate on Florida Titanium Sands

The State of Florida has approved the request of the DuPont Co. to mine the Florida heavy beach sands in the Trail Ridge section. The state allowed a ten-year lease with option to renew and five years to establish a plant. A $1,000,000 plant is to be constructed.

Florida Phosphate Mine

Swift and Co., fertilizer producers, will soon mine phosphate from a new pit near Agricola, Fla. Mining will be done by dragline and the new washer, comprising tabling and flotation, will have a capacity between 1500 to 2000 long tons per day.



Central States

Mechanized Mining at Eagle-Picher

At a meeting of the Missouri Society of Professional Engineers, S. S. Clarke, general superintendent of mines for the Eagle-Picher Mining and Smelting Co., emphasized the importance of underground mechanization in sustaining production from the low-grade Tri-State ores since the discontinuance of the Premium Price Plan. Loading ramps, drill-mounted jumbos, and battery trucks have all played an important role in cutting cost. The perfection of a detoxifying agent for Diesel exhaust gases was instrumental in permitting the use of Diesels for underground haulage.

Future plans of the company call for the construction of a mobile drill jumbo carrying a Diesel or electric-driven air compressor and combination loader and truck that will operate as a unit.

Mining Company Establishes Scholarship

The Montreal Mining Co. of Montreal, Wis., has established a four-year scholarship in mining engineering at the Michigan College of Mining and Technology.

Applicants for the scholarship are limited to residents of Gogebic County, Mich., or Iron County, Wis., who are sons of employes of the Montreal Mining Co. or the sons of former employes who have died, retired, or become totally disabled while in the employment of the company.

The scholarship pays an annual stipend of $500 if the winner is a resident of Michigan, or $575 if the winner is a resident of Wisconsin.

Coal Miners' Loss

The Indiana Coal Producers Association issued a report on March 31 based on the closure of 27 opencut mines which produced more than one-half the coal mined in Indiana. "Had these 27 mines continued in operation at their customary production rates, they would have paid nearly $6,000 each working day into the union's welfare fund from the 10¢ per ton levy provided under the 1947 Bituminous Coal Wage Agreement."

During the corresponding pay period of 1947, the United Mine Workers employed in these 27 mines, earned approximately $475,000. It may be estimated that in the same period of 1948 a similar amount of pay was lost to the miners. But the loss to the miners was only a portion of the economic pinch. Many communities suffered from power shortages, railroads laid off hundreds of workers as did many manufacturing industries. Merchants suffered from a loss of trade and even the government will feel the pinch in decreased tax revenues.

Lead Price Increases

Early in April the domestic price of lead was raised by 2½¢ to 17.30¢ St. Louis and 17.50¢ New York. Higher prices than the domestic price had existed in foreign markets for the six months prior to the price change. Now that the domestic price of lead has been raised the danger that domestic concentrates would move elsewhere has been removed. The new price constitutes an all-time high for lead.

Staff Changes of North Range Mining Co.

Recently the North Range Mining Co. made several changes in its staff in Michigan. P. A. Alexander has been appointed surface foreman of mines, succeeding the late Guy E. Neault. A. J. Guscatt is now superintendent of the Blueberry iron mine, John A. Nicolson is now mining engineer, and William Sirola is employed as geologist.

Rock Dust Test

In a recent report based on tests made by the Bureau of Mines at its experimental mine at Bruceton, Pa., it is stated that rock dust must be applied to within 40 ft of the working faces, instead of 80 ft as now required by the Federal Mine Safety Code. The report reveals that rock dust that stops 80 ft from the working faces of a mine must be able to produce a 100 per cent incombustible mixture and such concentration could not be obtained under actual coal-mine operating conditions.

Another phase of the tests demonstrated the ineffectiveness of the practice of suspending bags of rock dust from props in preventing the spread of a coal-dust explosion.

Copies of the report entitled "Tests in the Experimental Coal Mine to Determine Requirements for Preventing Propagation of Coal-Dust Explosions in Rooms," can be obtained from the Bureau of Mines' office in Pittsburgh.

Explosives Research

Missouri School of Mines and Metallurgy is sponsoring a research project to determine and evaluate the effectiveness of various explosives. An opportunity is open for undertaking research studies in this project and interested applicants are invited to write for further details.

The person appointed to pursue the study will be permitted to do full-time graduate work toward an advanced degree. The school has established a salary-stipend of $200 a month, continuing over a period of two years, for this research. The project is designed to begin about September 1, 1948. Inquiries or communications should be addressed to Dr. J. D. Forrester, chairman, Department of Mining Engineering, Missouri School of Mines and Metallurgy, Rolla, Mo.

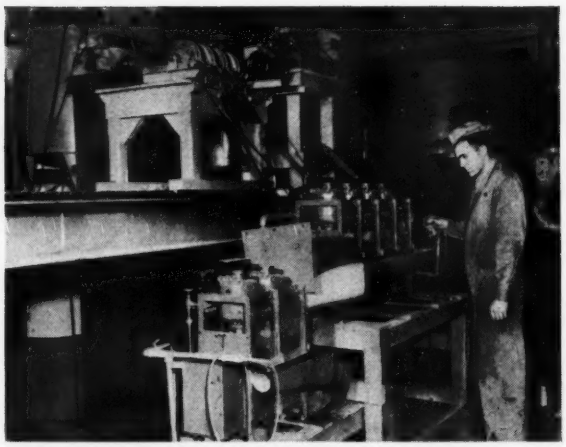
BEE-ZEE Screen Opening Stays Same Size Longer

Here's why: Bee-Zee screen bars are made of extra-tough steel that resists wear. And the bars are **round** — so that openings stay constant size until the tops of the bars are worn half through! Whatever your screening problem, it pays to use Bee-Zee screens . . .

See about it now.

BIXBY-ZIMMER
ENGINEERING CO.
961 Abingdon St., Galesburg, Illinois

Taconite Research Laboratory



Flotation pilot plant for batch testing taconite

Modern building houses complete ore-testing facilities

INCREASINGLY heavy shipments of iron ore from the Lake Superior region make economical concentration of lower grade ores necessary in order to conserve reserves of high grade, direct-shipping ores. The Oliver Iron Mining Co., a subsidiary of United States Steel Corp., has established a new ore research laboratory in Duluth, Minn., which will engage in long-range study to develop commercially useful concentrating methods for taconite, wash, and intermediate ores.

The new laboratory, with a total floor space of approximately 58,450 sq ft, has, in addition to a batch testing laboratory and a pilot plant test area, complete facilities for chemical analysis, microscopy, petrography, and specimen preparation.

The supply of mixed ore will continue for many years, but future shipments will contain larger and larger amounts of high-cost underground ores and high-cost concentrates as the proportion of direct-shipping, open-pit ore declines. Ultimately, the Lake Superior iron ore supply will consist largely of concentrates, with a moderate proportion of underground direct-shipping ores. An ever increasing proportion of these concentrates will be made from taconites, the original hard rock formation of the region.

Taconite ore bodies are explored by diamond drilling and samples are sent to the laboratory.

Microscopic examination of polished samples is made to determine the extent and manner of distribution of the iron oxide particles, which establishes whether or not the particles can be economically separated by crushing and grinding. If it is decided that crushing and grinding will reduce the rock to a mixture of separate particles of iron oxides and gangue materials, the batch laboratory then undertakes tests to develop a process for separating the iron oxide from the rest of the mixture to the greatest economical degree.

Since the iron oxide particles in taconite may be either highly or weakly magnetic, two types of separations may be considered—magnetic separation and froth flotation. If the batch tests show promising results, an experimental flow sheet, with an hourly capacity of perhaps 100 lb, will be set up to study individual phases of concentrating methods, and establish the value of the particular type of ore under study.

Large-scale samples from promising areas are run through a flow sheet in the pilot plant area of the research laboratory to develop the best beneficiating method. Operations are then transferred to a pilot plant at the ore site, and eventually lead to full-scale operations at the mine.

Keynote of the laboratory is flexibility of operations. A special arrangement was devised to permit the rapid assembly and change of flow sheets. In this procedure, a flow sheet can be assembled, altered or torn down completely in a relatively short time. Considerable space is thus saved that would be wasted by having several permanent flow sheet installations that would be used only as occasion demanded.

The processes developed for concentration of ores in the new laboratory will assure the United States of self-sufficiency in iron ore supply for a long time, and aid in conserving the high grade ores.

Nuclear Energy

(*Continued from page 30*)

ods of fueling nuclear-power generating equipment and removing the "ash"-laden nuclear fuel is a detailed problem that will require extreme care in design. Striking an encouraging note, Dr. Hutcheson stated "If the limited pool of nuclear physicists and chemists now available had to do all the work necessary for the practical application of nuclear energy in the electric power field, many years would pass before the first demonstration could be made. However, with a basic plan that envisions tapping the much larger supply of trained engineers and scientists available in industry and applying them to work on appropriate problems, it seems certain that the advent of nuclear energy in the electric power field is much nearer than otherwise."

But certain facts must be remembered in all postulating, as Dr. L. A. DuBridge, president of the California Institute of Technology, one of the nation's foremost authorities on the atom, recently pointed out. Annual production of uranium is now about 1000 tons and known reserves are about 30,000 tons. However only seven tons of U-235 can be produced from 1000 tons of uranium. From U-235 almost 3,000,000 times as much energy can be produced as from an equal weight of coal but the separation of a pound of U-235 from uranium costs nearly 3,000,000 times as much as a pound coal.

The immediate significance of atomic energy lies in its military use. Whether or not this energy is made available for industry within a few decades, aside from technical problems, rests largely upon the policy decisions of Congress pertaining to its development.

Spodumene Mine Builds New Concentrator

Lithium Corporation of America at its Edison mine at Keystone, S. Dak., in the Black Hills is constructing a new sink and float concentrator for beneficiating its spodumene ore. Lithium salts produced from spodumene are used by both the ceramic and metallurgical industry.

New Slope Mine in Illinois

St. Louis & O'Fallon Coal Co. plan to develop a new slope mine replacing Black Eagle No. 2, which will be exhausted within a few years. Estimated reserves of the new mine are 20,000,000 tons. Black Eagle No. 2 mine has been producing at the rate of 2000 tons daily using three cutting machines and three mobile loaders.

Eagle-Picher Moves General Offices

The Eagle-Picher Mining & Smelting Co. announces that its general offices will be moved to Miami, Okla., and will be located in the First National Bank Building in Miami.

COMPLETE FACILITIES

Mountain City Copper Mining Co.

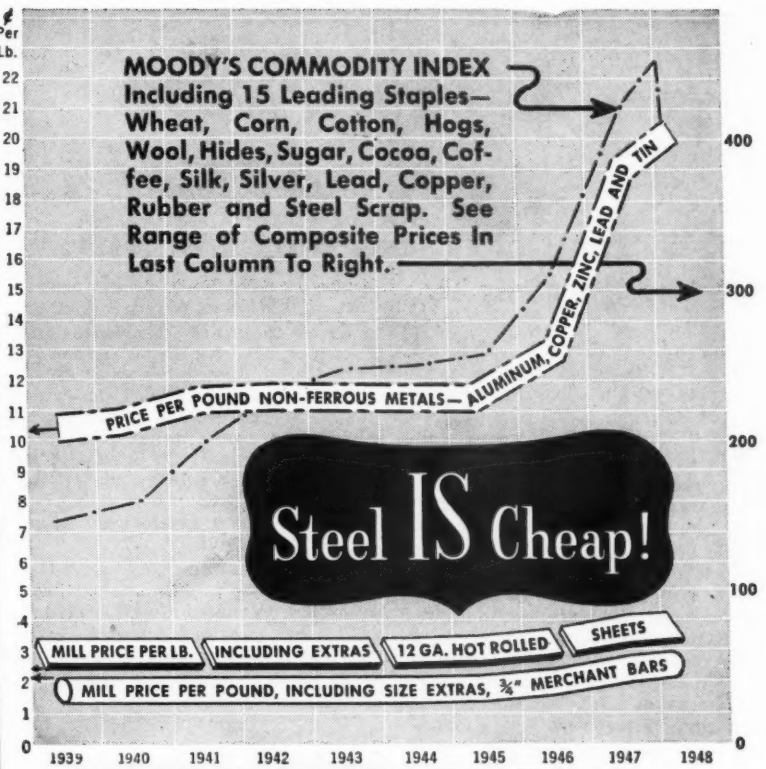
FOR SALE!

450 ton complete flotation mill for sale as an integral unit. This plant is all steel construction. Everything will move.

CATE EQUIPMENT CO.

49 EAST 9th SOUTH
SALT LAKE CITY, UTAH

EXCLUSIVE SALES AGENT


¢ Per Lb.
MOODY'S COMMODITY INDEX Including 15 Leading Staples— Wheat, Corn, Cotton, Hogs, Wool, Hides, Sugar, Cocoa, Coffee, Silk, Silver, Lead, Copper, Rubber and Steel Scrap. See Range of Composite Prices In Last Column To Right.
PRICE PER POUND NON-FERROUS METALS— ALUMINUM, COPPER, ZINC, LEAD AND TIN
Steel IS Cheap!
MILL PRICE PER LB. INCLUDING EXTRAS 12 GA. HOT ROLLED SHEETS
MILL PRICE PER POUND, INCLUDING SIZE EXTRAS, ¾" MERCHANT BARS
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22
0 100 200 300 400
1939 1940 1941 1942 1943 1944 1945 1946 1947 1948

STEEL PRICES LAG...

Far Behind Prices of Most Commodities!

It is easy for all to see, hard for some to admit—

1st, that steel prices are relatively low—

2nd, that price advances have been comparatively modest.

For example—note that the mill price, including extras, on 12 ga. hot rolled 60" x 100" steel sheets in 1939 was 2⅓¢ per lb. In February 1948, it had advanced less than 1¢ to 3¼¢ per lb. In the same period ¾ inch merchant bars, including extras, advanced from less than 2-1/5¢ to slightly over 3¢ per lb.

Sheets and merchant bars are two finished steel items in most popular demand. They comprise nearly 22% of all mill shipments of finished steel in 1947.

Now, compare prices on steel's most wanted items with composite prices on the five non-ferrous metals. In 1939 it was over 10½¢ per lb. By 1948 it had zoomed to over 20¢ per lb. Or, compare the steel industry's record of holding prices down with prices on the 15 leading commodities which affect the cost of living most. Composite prices of these shot up from an index of 150 in 1939 to over 450 as of January, 1948.

Had steel prices made comparable advances to non-ferrous metals, the price on sheets and bars would now be 4½¢ per lb. or 7¾¢ per lb. had steel prices advanced like commodity prices. **Steel IS Cheap!**

TRADEMARK REG.

MOLY-COP

COPPER-MOLYBDENUM-ALLOY

Grinding Balls

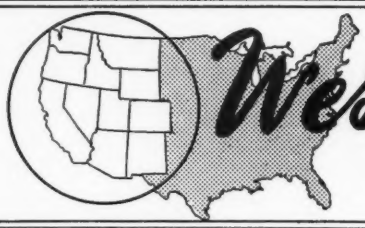
SHEFFIELD STEEL CORPORATION

HOUSTON — Carbon and Alloy Steel, Ingots, Blooms, Billets, Plates, Sheets, Merchant Bars, Steel Joists, Structural Shapes, Road Guard, Reinforcing Bars

KANSAS CITY — **TULSA** — Welded Wire Mesh, Wire Products, Wire Rods, Fence, Spring Wire, Nails, Rivets, Grinding Media, Forgings, Track Spikes, Bolt and Nut Products

SHEFFIELD STEEL

SALES OFFICES: Chicago, Ill.; St. Louis, Mo.; Des Moines, Ia.; Omaha, Nebr.; Wichita, Kans.; Denver, Colo.; Oklahoma City, Okla.; Dallas, Tex.; San Antonio, Tex.; Lubbock, Tex.; New Orleans, La.; Shreveport, La.



Western States

Uranium Production Policy Jells

On April 11 the United States Atomic Energy Commission announced a three-point program to stimulate the discovery and production of domestic uranium by private competitive enterprise. The basic points of the program are: government guaranteed ten-year minimum prices for domestic refined uranium, high grade uranium ores and mechanical concentrates; a bonus of $10,000 for the discovery and production of high grade uranium ores from new domestic deposits; and government guaranteed three-year minimum prices for the low grade carnotite- and roscoelite-type uranium-vanadium ores of the Colorado plateau area and Government operation of two vanadium-uranium plants in that area.

The new program offers an opportunity for prospectors and mining companies to participate in the nation's atomic energy industry by practicing their own initiative with the profit incentive. The AEC plans to continue and expand its own exploration, development, and research to aid private enterprise. Field exploration and surveys will cover private as well as public lands.

The guaranteed minimum prices are $3.50 per lb of recoverable uranium oxide less the cost per pound to refine to necessary purity as determined by the AEC after assay of a representative sample. A price of $3.50 per lb will be paid for pure uranium oxide. Consideration will be given to the presence of recoverable gold, silver, radium, thorium, and other valuable constituents of the ores, depending upon the cost of recovery.

As a special incentive, the bonus of $10,000 for production will be paid upon delivery to the commission of the first 20 short tons of uranium ore or mechanically-produced concentrates assaying 20 per cent or more uranium oxide from any single lode or placer mining location on the public domain which has not been previously worked for uranium, or from a comparable area on private property. In addition a special development allowance to the base price has been provided to encourage discovery of carnotite or roscoelite ores, but the bonus does not apply to the production of these ores.

Under the AEC schedule the producers will receive $20.40 per ton for carnotite- or roscoelite-ores at Monticello, Utah, or Durango, Colo., which contain 2 per cent vanadium oxides and 0.20 per cent uranium oxide. The schedule provides for payment of $1.50 per lb of uranium oxide (U_3O_8) for the delivery of ores assaying 0.20 per cent, plus a development allowance of 50¢ per lb.

Complete information describing the ore-buying program is available from the Commission's Washington, D. C., headquarters, from the AEC office in Grand Junction, Colo., and from the office of the AEC at 70 Columbus Avenue, New York, N. Y.

Utah Fuel Co. to Develop Colorado Coal

An estimated 100,000,000 tons of coking coal located in the Coal Creek district of Gunnison County, Colo., will be developed by the Utah Fuel Co. in a $5,000,000 program that will begin this year. The deposit was discovered during the early part of World War II during drilling tests for a proposed reservoir site. It has been reported that sufficient coking coal is available to supply a western steel industry with fuel for 50 years.

Ray Open Pit

Kennecott Copper Corp. has announced its decision to mine by open-pit methods the larger portion of the ore body at Ray, Ariz. The ore body in question is a large, low-grade surface deposit lying to the west of the present underground workings.

The corporation states that this partial change from underground to surface mining will extend the life of the property, reduce costs, improve labor conditions, and expand production. When the pit is fully developed, a daily production of 15,000 tons is expected instead of the 10,000 tons now mined by underground caving.

Extensive exploratory and check drilling has been in progress during recent months and the diversion of Copper Canyon Creek, a necessary preliminary to the development of the pit, has been started. Work will be extended into a full-scale stripping program as conditions permit and equipment is available. According to present plans some tonnage from the pit will be available early in 1950 for mining and treatment.

Newmont Makes Progress in Goldfield

Joseph Mihelich and William Blair Meldrum have arrived at Goldfield, Nev., to supervise the mill which is to be built by the Newmont Mining Corp. adjacent to the old Florence shaft. The foundation of the new 100-ton mill is completed and much of the machinery is being moved to Goldfield from Grass Valley, Calif. The two milling men came from Leadville, Colo., where they were connected with the Resurrection property of the Newmont Mining Corp.

Revival on the Comstock

Operations were resumed at the Consolidated Chollar, Gould & Savage mill on ore uncovered in 1947. Stripping operations conducted in January and February of this year disclosed an additional tonnage of good ore which is also being milled.

DIG, HAUL and DUMP *at* LOWEST COST

Scraping Heavy Topsoil Onto High Spoil Pile

***with* SAUERMAN POWER SCRAPER**

ON work where materials are to be moved distances of several hundred feet or more from pits, ponds, banks or stockpiles, a SAUERMAN Power Scraper or Cableway is a great money-saver because it will dig, haul and place the materials in one operation.

Sizes range from small portable units designed for cheap handling of a small hourly tonnage of loose materials up to powerful machines that will take 15 cu. yds. at a bite and move this big load a distance of 300 ft. in about one minute.

Write for Catalog

SAUERMAN BROS., Inc.

540 S. Clinton St. CHICAGO 7

Clear Creek Mines Change Hands

The once famous Argus group of high grade silver mines near Georgetown, Colo., has been purchased by O. Barlow Willmarth of Georgetown. Mr. Willmarth also purchased the Baker mine, another old silver producer. Both of these properties can be worked through the Atlantic and Pacific tunnel, also owned by Mr. Willmarth. The tunnel's face lies about 1500 ft below the old workings of the Argus group and the downward extension of the several other properties. All future activities will be undertaken from the A-P tunnel.

RFC Files Suit

The RFC filed suit in the district court at Silver City, N. Mex., asking foreclosure and sale of historic mining properties at Steeplerock, Grant County, to satisfy a claim of $98,000 against a Utah mining company. Named as co-defendants are the Continental National Bank & Trust Co. and the Exploration Syndicate, Inc., of Salt Lake City. The RFC asked that a receiver be appointed and the property involved be sold to satisfy the Government's claim.

Tacoma Smelter Expands

Plans for a $1,000,000 construction program at the Tacoma, Wash., plant of the American Smelting & Refining Co., have been launched under the aegis of Earl R. Marble, smelter manager. The first step will be a $230,000 ore unloading storage plant which has the Western-Knapp Engineering Co. of San Francisco, Calif., as contractor for the project. Other work that will be carried on this year, and deep into 1949, will be rehabilitation of an ore plant and extension of ore storage facilities. Further construction permits will be obtained as the work progresses.

El Paso Smelter Undergoes Repairs

On April 1 the copper section of the El Paso Smelter, American Smelting and Refining Company, El Paso, Tex., was closed down to permit extensive repairs to the copper furnace and boilers. As a consequence, the smelter will be unable to accept copper ores for smelting for an indefinite period. During the remodeling and repairing, all Arizona copper ores, normally sent to El Paso, are being diverted to the company's Hayden Smelter, Hayden, Ariz.

The work at the copper section at El Paso will not affect operation of the lead section, and the smelter will continue to accept lead ores as usual.

Get Greater Safety plus "the Low Cost of Lifting" with SIMPLEX Mine Jacks

No. 85A Simplex Ratchet Jack Raises Cutter Bar

Choose Simplex Mine Jacks for Safety First in all types of mine jacking. In addition you get easier operation, longer jack life and efficiency to lower your cost of lifting.

Check these important Simplex features: Drop forged, alloy steel heat treated parts — Precision machining — Expansion rivets instead of machine screws — Unbreakable trunions — No fulcrum pins — Maximum strength with minimum weight.

Specify Simplex—get the benefit of the superiority which resulted in these jacks being awarded the *only* gold medal for the safety of jacks by the American Museum of Safety.

GENERAL PURPOSE MINE JACKS

Single Acting — Ratchet Lowering

A Jack for every heavy duty mine job—5-to-35 tons capacity. All lift full capacity on cap or on the toe of Jack, a feature exclusive with Simplex!

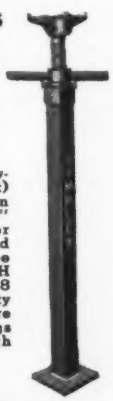
WRITE FOR BULLETIN MINES 47

Get this fully illustrated bulletin with detailed information on all Simplex Mine Jacks. In addition to those shown here these include: Post Pullers, Timber Jacks, Electrided Track Jacks, Journal Jacks, Anchor Jacks, Wire Tensioning Jacks, and the Simplex-Jenny Center Hole Hydraulic Puller.

Adjustable MINE ROOF JACKS

M8, M9, M16 and M17

3 Types of Heads



Type "FS" Flat Swivel (on Jack at right) for use with wooden pieces. Type "C" (above left) for square and round timbers, and Type "FF" for small H beams and rails. 8 and 16-ton capacity models with square tubing or fittings only for use with round pipe.

Simplex PIN-UP JACKS

8 and 16-ton capacities with new type "FL" head—flat with lugs—for square tubing and round pipe. Eliminates the danger of knocking out posts. Enables loading machines to load out full cut. Unnecessary to re-set jack.

GEARED JACKS 25 and 35-ton capacities. For heavy duty work such as retailing mine or railroad cars. Built for power, speed, ruggedness.

HYDRAULIC JACKS 3 to 100-ton capacities. Safety tested to 50% over capacity. Easy to operate, vertically or in horizontal position.

Simplex LEVER · SCREW · HYDRAULIC **Jacks**

TEMPLETON, KENLY & CO.

1042 South Central Avenue, Chicago 44, Illinois

New P.-D. Smelter for Ajo

The erection of a new $5,000,000 copper smelter for the New Cornelia Branch, Phelps Dodge Corp., Ajo, Ariz., was approved at a recent meeting of the corporation's board of directors, according to an announcement by Harrison M. Lavender, general manager. The new smelter will have a capacity of 10,000,000 lb of copper monthly.

Plans for the smelter are now on the drafting boards and work on the structure probably will be started within the next two or three months. Phelps Dodge hopes to complete the plant within two years, barring difficulties in obtaining materials and equipment.

The smelter will be erected just east of the concentrator which is milling 25,000 tons of ore daily from the Ajo open-pit. Waste heat from the smelter will be used in part by the new power plant for the generation of electricity. Furnaces of the smelter are to be fired by natural gas which already is available in the Ajo district.

At the same meeting of the board of directors, authorization was given for the construction of 110 new homes, to cost approximately $700,000.

The expenditures just authorized will increase to approximately $12,000,000 the company's investment at Ajo since the improvement program there was started about two years ago. Electrification of the Ajo pit haulage system was completed recently at a cost of $2,250,000, and the steam power generating plant is being expanded at a cost of $2,500,000. More than 50 new homes have been completed, schools are being enlarged, and recreational and community facilities are being provided. It is estimated that the smelter will increase the population of Ajo by about 1000.

Swansea Mines Begin Milling

Milling operations of the Silver Bell mine of Swansea Mines, Inc., of Helena, Mont., have begun on ore developed during the past two years. Concentrates will be shipped to the Anaconda Copper Mining Co. for smelting.

Horn Silver Starts New Mill

Ore from the Horn Silver mine in Milford, Utah, is being milled in the new 500-ton plant recently completed by Metal Producers, Inc. Substantial tonnages of low grade copper, lead, and zinc ores, with some of the rock running as high as 25 to 30 per cent lead and zinc, has been blocked out in the mine, according to Jack Lowe, general superintendent. Max Harcourt is mine superintendent and Andy Kerr is mill superintendent at the Horn Silver mine.

1948 Metal Mining Convention and Exposition, at San Francisco

PLANS for this important meeting of the metal and nonmetallic mining industries, to be held in the Civic Auditorium in **San Francisco, September 20-23,** are developing rapidly under the leadership of Worthen Bradley, president, Bradley Mining Co. and Chairman of the Western Division of the Mining Congress. With 1948 marking both the 50th Anniversary of the American Mining Congress and the centennial of the discovery of gold in California, this promises to be a banner get-together of the mining industry.

Early next month a nation-wide committee headed by E. S. McGlone, vice-president, Anaconda Copper Mining Co., will draw up a program covering the economic and legislative problems of mining, together with a comprehensive discussion of new developments in mining and milling practice and equipment. The Program Committee will welcome suggestions as to topics and speakers, which should be forwarded to the American Mining Congress, Ring Bldg., Washington 6, D. C.

The most complete display of metal mining and milling machinery and equipment ever staged awaits mining men at San Francisco. Exhibits of some 80 manufacturers will occupy 24,000 sq ft of floor area. These companies are going all-out to show the industry their latest developments for increasing efficiency and reducing operating costs.

The Exposition affords progressive mining men an extraordinary opportunity to check up on new developments, to consult with the manufacturers' trained representatives, to study and compare their equipment and services, and to plan for the future. This is particularly true for men actively engaged in operating work—superintendents, engineers, foremen, millmen, chief electricians, master mechanics, shift bosses, etc.—all of whom will profit from a thorough inspection of the exhibits, together with the discussions of operating problems.

All the Convention sessions and the exhibits will be held at the Civic Auditorium, and there will be no official hotel headquarters. All hotel reservations are to be made direct with the hotels. **Write or wire promptly to the hotel of your choice.**

On to San Francisco!

Fall Operation Planned for New Magma Mill

Magma Copper Co. at Superior, Ariz., expects to have its new milling plant completed and in full operation in September. The mill will have a daily capacity of 1500 tons of ore. The crushing section of the mill, with a capacity of 200 tons of ore an hour, has been in use for several months, but difficulties in securing machinery have delayed completion of the rest of the mill. The plant, including the building, is entirely new and will replace the present mill which will be dismantled when the new one is in operation.

The Modern Prospector

To provide greater articulation for the growing mining industry of the Northwest, the Northwest Mining Association at Spokane, Wash., has launched a new four-page, informative bulletin entitled "The Modern Prospector," which is being sent to its membership in the region. Roger O. Oscarson, secretary of the mining association, has explained the title by saying that "the modern prospector is the man who finds the mine; the geologist initiates the program; the mining engineer and miner follow, but none can function without financial support. All are part of the team."

BOOK REVIEW

WILL DOLLARS SAVE THE WORLD?—*By Henry Hazlett. D. Appleton-Century Co., N. Y., 1947. 95 pages.* $1.50.

ALWAYS clear and concise in his statements, Henry Hazlitt, in this volume on the possible results of the Marshall Plan, points the way towards the steps we can take to get our domestic economics in order. Mr. Hazlitt urges the return to a real instead of a merely technical gold basis for our currency. Another point he makes is to invite all nations to cooperate in returning to a world gold standard.

Effectively argued is the statement that making heavy loans or gifts to European nations is not the most effective way of fighting world Communism. The immediate and future results of European recovery program are discussed in a clear and rational manner.

Mr. Hazlitt builds an impressive tower of fact upon a basis of economic truths which have been tested throughout the ages. Every American owes himself an understanding of the positive program that will lead to the solution of our economic and political problems as presented in "Will Dollars Save the World?"

I'M YOUR MAN

FOR THE *FASTEST* WAY TO LAY PIPE... WITH *MINIMUM* LABOR COSTS!

ON "VIC VICTAULIC" at the right you can *see* the two-bolt simplicity of Victaulic Couplings that saves valuable man-hours and labor costs on installation of *any* piping system! Just a few turns of a standard T-wrench buttons up the two half-housings of Victaulic Couplings ...with no specially trained or skilled labor needed!

ALSO, THESE FEATURES are built into every Victaulic-coupled piping system: *flexibility* that automatically allows for contraction or expansion, lessens need for expensive bends and fittings...*a union at every joint* for easier, quicker repairs or salvage...*positive-locked* joints that can't pull out or blow off!

WHAT'S MORE, Full-Flow Victaulic Elbows, Tees and other FITTINGS increase pipe-line delivery *at lower pumping costs!*

REMEMBER, TOO—the new "Vic-Groover" grooves pipe ends with half the effort *and twice as fast* as ordinary pipe threaders!

WRITE TODAY for Victaulic Catalog and Engineering Manual No. 44...and for the new "Vic-Groover" Catalog No. VG-47.

SELF-ALIGNING PIPE COUPLINGS

VICTAULIC

EFFICIENT FULL-FLOW FITTINGS SIZES—3/4" THROUGH 60"

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Victaulic Company of Canada, Ltd., 200 Bay St., Toronto 1

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Pipe Couplings, Inc., 30 Rockefeller Plaza, New York 20, N. Y.

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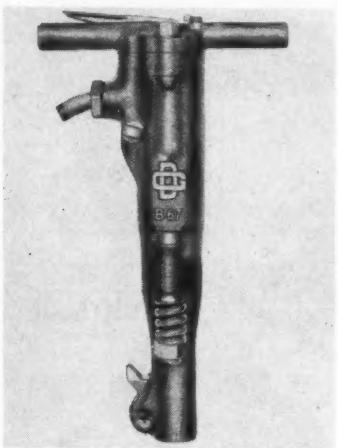
Manufacturers Forum

New Breaker Available

A medium-weight concrete breaker, was recently announced by the Gardner-Denver Co, for use in general demolition work where the heavier breaker is not required. Called the model B67, the breaker is especially



suitable for boulder breaking in quarries or mines. Built on the same design as the model B87, the new machine also incorporates a safety latch on the throttle valve handle to prevent accidental operation of the hammer. The breaker weighs 63 lb, has an over-all length of 23 in., and can be fitted with chucks for either 1⅛ in. or 1¼ in. hexagon tools.

Absorbent Bands for Comfort

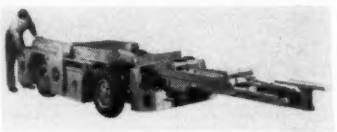
The Mine Safety Appliances Co. is now producing an efficient perspiration retainer designed to provide greater comfort for men working on hot jobs. The Coolband is a light continuous band of absorbent material without metal parts. It improves comfort and efficiency by preventing sweat dropping into the eyes, and on goggles or glasses. It may be thoroughly cleaned by hand-squeezing in soapy water and may be sterilized by the same method, using customary germicidal solutions.

Mine Timbering Machine

The Baker Industrial Truck Division of The Baker-Raulang Co. has announced the production of battery-powered, pneumatic-tired timbering machines for work in conjunction with trackless gathering systems in coal mines.

The tractor-mounted machine carries a hydraulically controlled boom which lifts the cross bar holding it against the roof while posts are cut to length on the circular saw mounted on the machine.

In operation the timbering machine draws a two-wheel trailer carrying bars, posts, cap boards, and wedges. At the face, a cross bar is moved on rollers from the trailer across the deck of the machine and into the boom saddle. Positioning of the bar is accomplished by action of the boom which elevates, swings 90 deg to either side of center and retracts horizontally in the direction of the boom. With the bar against the roof, posts are measured, taken from the trailer, and cut to length on the



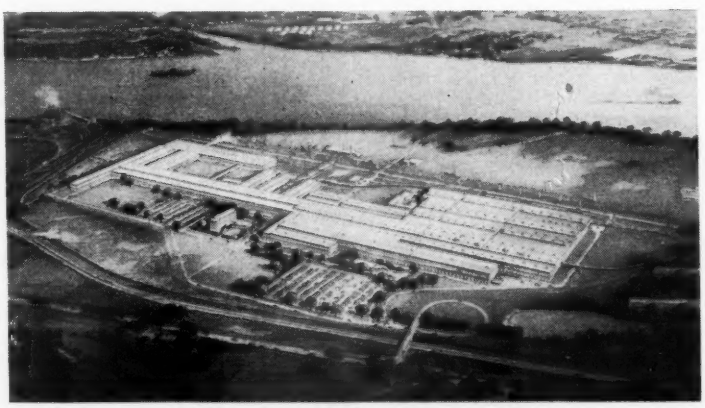
hydraulically operated 24-in. circular saw and wedged in place.

The equipment can follow any path across the face as it operates on battery power. The advantages of the trailing load are greater capacity for timbering material and the elimination of the transfer of material at the parting. A different design is produced for high seams and for low seams.

Aluminum Builds Aluminum Plant

In expanding its sheet and plate rolling facilities, the Aluminum Co. of America is using great quantities of aluminum in the construction of its nearly completed Davenport plant. The giant plant extends for nearly a mile along the banks of the Mississippi river near Davenport, Iowa and with the exception of 25,000 tons of structural steel framework, is basically an all-aluminum project. More than three miles of aluminum insulated wall panels, compose the bulk of the exterior surface of the huge project. The aluminum roof which sprawls over 47 acres of the modern rolling mill contains nearly 3,000,000 lb of aluminum.

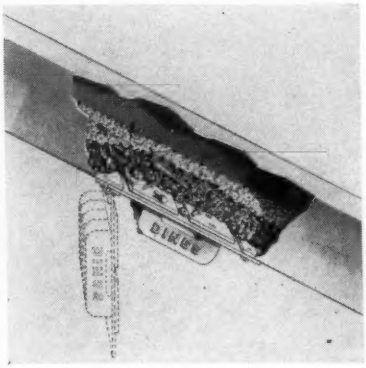
Sheet rolling equipment to be installed into the new plant will turn out the widest aluminum sheet in the world.



Artist's concept of Alcoa's Davenport plant

Alnico Magnets Remove Tramp Iron from Chutes

A new line of permanent magnetic separators known as Perma-Plate magnets to remove tramp iron from materials traveling down chutes or through ducts has been developed by the Dings Magnetic Separator Co. The magnets are intended for protec-



tion of grinders, crushers, stokers, pulverizers, and other machinery susceptible to damage by iron and for purification of such materials as food, feed, grain, coal, fertilizer, rubber, textiles, ceramics, and plastics.

A series of "C" shaped Alnico magnets are secured to steel plates and the entire assembly mounted on an aluminum plate. Installation is made by cutting away a section of the bottom of the chute and installing the magnet in its place. The magnet is mounted on hinges so that it can be swung away for removal of collected iron. The steel pole plates project up from the face of the magnet providing edges which help mechanically to arrest and hold the iron.

Mine Safety Device Guards Against Sparks from Faulty Equipment

A safety device which is claimed to prevent faulty electrical mining equipment from emitting sparks was announced by the Mines Equipment Co. of St. Louis, Mo., and the Westinghouse Electric Corp.

Known as the safety circuit center, it consists of a system of electric circuit breakers and relays housed in an explosion-proof jacket. It cuts off power to individual mining machinery, such as cutters, loaders, and drills, when any one of them develops a short circuit.

When a defect develops in one of the machines or the insulation breaks down in either the machine or the cable, the change in the amount of current flowing through the apparatus automatically shuts off the power. Sparks can occur only inside the explosion-proof safety center or inside one of the special couplings, where they cannot ignite the gas. Cost of the "Watchdog" will range from $100 to $1300.

Conveyor Belt for Hot Materials

The Hewitt Rubber Division, Hewitt-Robins, Inc., has developed a conveyor belt cushioned with rubber and strengthened with glass for conveying hot materials. In one foundry, fiber-glass belt of this type was in use for six months carrying red hot foundry sand and was found to give superior service and much longer life than the cotton and asbestos belts previously used. Simultaneously the company announced a fiber-glass rubber hose that resists acid. The new hose in addition to being resistant to acid waters can be used at high working pressures in air and water service.

Largest Coal-Cleaning Plant

What will be the world's largest coal cleaning plant is to be built by the Jones & Laughlin Steel Corp. to serve its consolidated No. 4 and No. 5 coal mines at Vestaburg, Pa. The plant is designed to produce 18,000 tons of washed coal daily. Waste material totaling 8000 tons will be discarded from the 26,000 tons of raw coal sent each day to the cleaning plant. The Westinghouse Electric Corp. has been awarded the contract to supply more than 10,000 hp in some 300 odd electric motors. Power to drive these motors will be delivered through eight 1500-kva, air-cooled power centers located throughout the cleaning plant.

— *Announcements* —

American Car and Foundry Co. announces the appointment of **Frederick H. Norton** as vice president in charge of all sales for the company. Mr. Norton came to ACF in April 1945 as an Assistant Vice President in the Sales Department.

F. H. Norton

He succeeds **R. A. Williams** who has resigned as a Director and Vice President in charge of sales to accept the Presidency of The Standard Railway Equipment Mfg. Co.

Gordon MacVean, President of National Mine Service Company, Beckley, W. Va., has announced the appointment of **N. R. Chillingworth** as Director of Sales Promotion. Mr. Chillingworth will have charge of directing and coordinating the advertising and promotional activities of the firm's four divisions—Bemeco Division, Beckley, W. Va.; All-State Division, Logan, W. Va.; Kentucky-Virginia Division, Jenkins, Ky. and the Anthracite Division at Forty Port, Pa. For many years, Mr. Chillingworth has been closely associated with the mining field in handling the advertising and sales promotion of companies prominent in the industry.

* * *

Roberts and Schaefer Co. announce the removal of their offices in Chicago on May 1st from 307 North Michigan Avenue to enlarged quarters in the Randolph-Wells Building at 130 North Wells Street, Chicago.

* * *

Kennametal Inc., Latrobe, Pennsylvania announces the appointment of **Wallace Young** as special representative for the sale of Kennametal mining, quarrying, and construction tools in the West Indies, and South and Central America south of Mexico.

CATALOGS AND BULLETINS

HOSE COUPLING HANDBOOK. *Hose Accessories Co., Philadelphia, Pa.* An interesting hose coupling handbook and service manual is available upon request. This 20-page booklet offers assistance on (1) selection of the correct type hose coupling for each service use; (2) correct procedure in use of hose couplings for maximum service at lowest operating overall cost; and (3) avoiding hose abuse. Those interested in additional information on "Le-Hi" couplings and fittings are requested to write for the company's general catalog.

SYNTHETIC RUBBER. *E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.* Approximately four times a year Du Pont publishes the Neoprene Notebook. From time to time articles appear which are of considerable interest to the mining industry. In their booklet No. 39 is an item on Neoprene jacket electrical cable for use underground. Several advantages are claimed by the manufacturer in addition to light weight and flexibility. Specially compounded Neoprene jackets have been tested successfully under a great variety of underground conditions.

TRUCKS AND TRACTORS. *Mack Trucks, Inc., New York, N. Y.* In a new booklet entitled "Mack in the Mines and in the Quarries," are described trucks and tractors powered by gasoline, diesel, and butane-fueled engines. The booklet describes and illustrates a variety of truck and dump body designs used in hauling of ore, coal, rock, and earth. Copies are available upon request.

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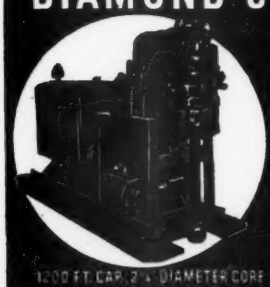

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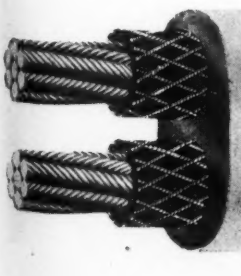

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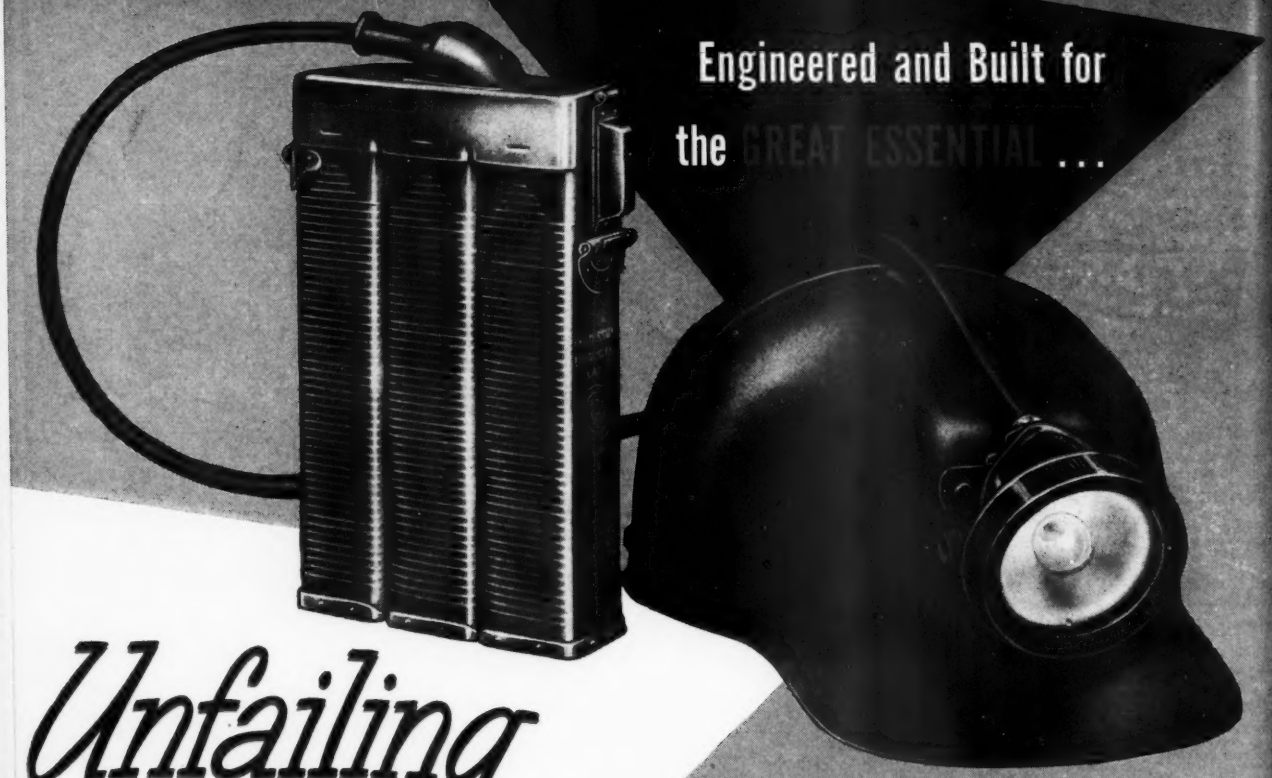

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